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Price: \$9/year

Unbundled 360 Compiler Prices: \$40 to \$275/Month

By Frank Piasta, Peter L. Briggs
Of the CW Staff

WHITE PLAINS, N.Y. — IBM has announced prices for some more S/360 compilers. These were disclosed with the announcement of the Time-Sharing Option (TSO) for OS/MVT and the Interactive Terminal Facility (ITF) for the 360/25, and up, under DOS.

These packages offer Basic and Interactive PL/I, as well as two new Fortran compilers, a new Fortran library, and an ANSI standard version of Cobol.

These are the first IBM language compilers for the System/

360 to be priced separately.

The System/3 RPG II was previously pegged at \$35. These prices provide the first available insight into IBM's pricing plans for future S/360 compilers, potentially affecting almost 13,000 current installations in the United States.

Prices Announced

Cobol, version 3 of the American National Standards Institute Cobol, will be leased for \$40/mo.

Fortran G1 will be leased for \$65/mo. The Fortran Library

will be leased for \$65/mo.

The ITF package, with either Basic or Interactive PL/I, will be leased for \$120/mo. with a \$60 added charge for the additional language, if desired.

The TSO utility packages will be leased, as a group, for \$145/mo., and a new type of Fortran, known as Code-And-Go Fortran, will be available for \$275/mo.

Prompters, designed to facilitate the terminal use of Assembly Language and other languages such as OS Cobol F, will also be leased as a group, for an additional \$30/mo..

Compared to proprietary compilers now available, these prices are quite low, but one user of IBM's time-sharing software has his doubts: "Whether software is expensive or not depends on whether it works or not."

Pricing Policy

The relatively low pricing of Cobol based on the large scale of customers available to IBM, represents a serious threat to the growing software industry, according to some sources.

The "unbundling" announcement had stimulated independent suppliers into planning to

compete with IBM for the compiler market.

Referring to the newly disclosed prices, Rex A. McWilliams, chairman of the board of National Computer Analysts, Inc., a software producer, said, "Probably no one would be able to compete at that level."

"IBM's pricing policies might be interesting to investigate; someday they might be disclosed."

Similar sources believe that no company other than IBM could afford to develop a new compil-

(Continued to Page 4)



Users instructions to solve a square root problem on the new systems are shown underlined here. The computer response in Basic, is shown in capital letters.

Colorado Students Allege Bias Slowing New Computer Approval

By Edward J. Bride
CW Staff Writer

DENVER, Colo. — Local students have fired charges of bias and bureaucracy against the state officials in a drawn-out battle to provide data processing classes an opportunity to see a computer.

The charges arise from student attempts to get "hands-on" experience before they graduate from the data processing department of the Community College of Denver. At present, the college's data processing center is empty, and student programs are run on a nearby hospital computer.

The students are charging the with delaying approval of

hardware until the college's selection conforms to "biased" and pre-selected state configurations.

Conforming to state preferences, the students allege, would result in increased costs and "inadequate" hardware.

The charges are tied to charges of pro-IBM bias, made last summer by three competitors of the computer manufacturing leader [CW, Sept. 17].

The students are led by 19-year-old James Cokas, a DP major in the two year course. They are becoming impatient, and have picketed the office of Dr. E.W. Sandberg, state administrative director.

They are protesting delays which, according to Cokas, are

giving them an "inferior" education in data processing.

They also claim that a state policy requires all newly purchased EDP equipment to be "compatible" with existing equipment, and that the state's interpretation of "compatible" is, roughly, "IBM equipment, like we already have."

College Experts Prefer NCR

An evaluation by DP experts at CCD determined the NCR Century 200 to be the preferred model, eliminating IBM's 360/25.

"Although IBM was not asked to submit a bid, Cokas charges, "they did anyway".

(Continued to Page 4)

IFT will support up to 12 terminals on the 360/25, and up to 31 terminals on larger systems. Along with the time-sharing facility, two new languages were announced: Basic, and Interactive PL/I.

The other package is known as the Time-Sharing Option (TSO), and runs on the 360/50 through

the 360/195 under OS/MVT. The only limitations on terminals, the company says, are imposed by the amount of core available.

One, a program product called the Interactive Terminal Facility (ITF), provides time-sharing, for the first time the company says, to 360/25 users under DOS. It will also operate on any larger S/360, according to IBM.

Up to 31 Terminals

The ITF package offers the smaller-scale S/360 user an opportunity to have an in-house time-sharing system that supports files, common languages, and 360-compatible programs.

The package is available in two versions, with the difference being the choice of language: Basic, or Interactive PL/I.

The package price, for the monitor program and one of the two languages is \$120, and the second language can be added for an additional \$60, according to IBM.

PL/I is expected to be a limited subset of the OS PL/I with features to optimize its use at a terminal. While no detailed data is immediately available, one source indicated that this version of PL/I might closely resemble Allen-Babcock's Rush PL/I.

With Call/360 Basic around for some time, it is also anticipated that ITF Basic will strongly resemble Call/360 Basic.

The ITF package uses the IBM 2741 communications terminal, with up to 12 terminals on a 360/25, and up to 31 terminals on larger 360s, the company says. ITF requires 48K for full operation under DOS, and 64K with concurrent batch operation, the company says.

ITF can also be run under OS, and even under the second package announced, TSO providing Interactive PL/I to OS user. Under OS, ITF requires 128K of

memory, but no figures as to the maximum number of terminals supported were given.

TSO Capabilities

The TSO package, considered as an enhancement to OS, and therefore free of charge, included 10 new separately-priced program products including: a new Fortran G1 compiler, a new ANSI Standard Cobol Version 3, a new Fortran Library, another new Fortran — Code-and-Go Fortran, and a group of data manipulation utility commands.

The Code-and-Go Fortran accepts both fixed-format and free-format input and has simplified I/O statements to facilitate its use as a terminal language, the company says.

TSO requires at least a 384K system for dedicated use, or a 512K system for use in a concurrent batch environment, according to IBM.

"Both of the new time-sharing methods have the ability to let the computer process conventional 'batch' jobs at the same time it is solving problems of many people at many terminals," according to Howard G. Figueroa, company divisional vice-president.

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IBM Charters British Engineering Firm To Produce Computer of Desired Quality

LONDON, England — IBM's new UK-built computer does not worry the opposition one little bit. It was described by various UK sources as old-fashioned, impractical, beautiful, but useless and as competition only to the Honeywell Emmett computer —

a contraption designed by British cartoonist Roland Emmett and built from junk.

All of which is true, but IBM does not mind the comment as their new machinery consists of two exact replicas of the unit of Charles Babbage's analytical en-

gine in the Science Museum, South Kensington.

The two models built for IBM by Rhoden Partners, a firm of precision engineers normally engaged in the design of production machinery, are now in New York as a part of IBM's antique calculator collection.

They are not on public display, nor does IBM have any plans to exhibit the collection, according to a company spokesman.

Some of the original tools and materials from Babbage's own workshop were used in the construction of the models that are valued at \$36,000 each.

The models took two years to build, according to Pieter Boodt, one of the engineers engaged on the project. The work involved the dismantling into its 1,500 component parts of the Babbage engine, and the measurement and the analysis of the materials used.

In some cases, Boodt said, they were amazed by the quality of

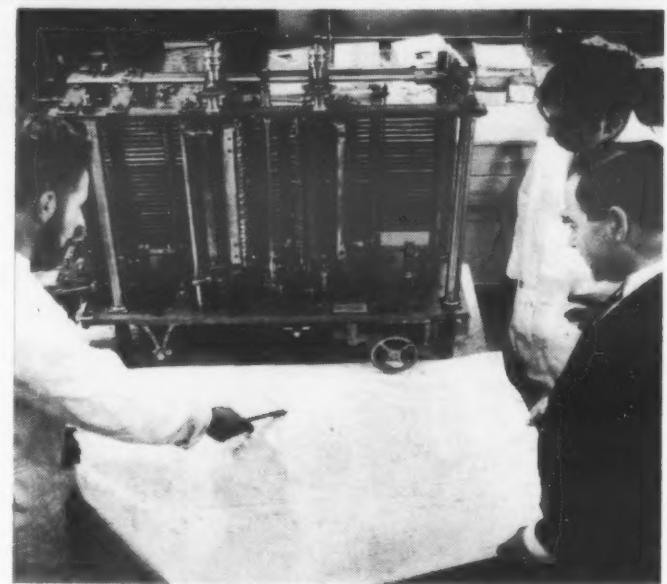
Expense Jump Up to 25% Foreseen From Unbundling

NEW YORK — Computer users will soon feel cost increases from 15% to 25% because of unbundling, according to Computer Sciences Corp. executive Robert H. Kassel.

Speaking to a meeting of the American Management Association, Kassel also predicted that businessmen would lean harder on network time-sharing services to reduce their data processing costs, and that independent software and services companies will

benefit as EDP managers shop around to save money.

Kassel cited budget overruns, curtailed operations, and delays in developing new systems as penalties of the price squeeze. He also suggested that businessmen can keep their costs down by using more packaged applications programs, thus sharing software costs as well as cutting hardware costs through time-sharing.



Three employees of Rhoden Partners are comparing their drawings taken from Babbage's original analytical engine, with one of the two models built for IBM.

the workmanship, and in other cases horrified by the roughness of the parts.

One problem in making the models was finding contractors who could deliberately make

parts as poorly finished as some of those in the original.

The two machines have been artificially aged to resemble exactly Babbage's engine as it appears today.

System/3, Part II: From the Other Camps

Companies Not Apprehensive About New Competition

By Frank Piasta
CW Staff Writer

Some competitors now say System/3 is helping them.

Reactions range from a position that System/3 will have no impact on the market to that of happiness over IBM opening a new market.

Predictably, no one admits to any feelings of apprehension over the new product.

NCR, for example, maintains that there has been no perceptible impact on their Century line or any other of their product lines.

According to G.P. Williamson, assistant vice-president for EDP products, NCR has received quite a few reports from their field organization that many of their prospects had been waiting for the IBM release.

After the System/3 had been announced, the prospects ordered Century systems, the IBM system being too small to fill

their needs, according to NCR. Williamson has indicated that according to NCR research, IBM is not attacking the small magnetic file user market. On a price/performance basis, NCR claims that the System/3 is not competitive.

The minimum disk-oriented configuration of the System/3 will rent for \$1,350, but the smallest configuration large enough for practical use would rent for about \$1,600 per month, they say.

Several systems currently on the market in the \$1,800 to \$1,900 class, which includes the disk-oriented Century 100, would, in NCR's viewpoint, prove to be better values for users.

Williamson said, "The Century 100 sales effort is aimed at the card-oriented computer market, specifically the IBM 360/20. The System/3 will therefore provide a large prospect population for

the NCR Century series when the System/3 user is ready to upgrade his installation."

A spokesman at Honeywell EDP agreed that the System/3 is not expected to have much impact on their market. The Model 110 of the 200 series is more nearly competitive with the IBM 360/20, he said. They speculated that the average System/3 order represents an upgrading of the installation of only \$300 to \$500 above the price of the unit-record installation it will replace. At this level, it represents no real threat to the Honeywell market.

GE Believes It Is Great

GE feels that the System/3 announcement was the greatest thing that could happen to the small computer market, according to Walter Waple, who heads the GE 55 sales program.

The GE 55 is a keyboard-equipped computer with card-handling capability, selling in the System/3 price range.

Waple said, "The main marketing problem is to create an awareness in the prospective user that there exists in EDP a source of help in the solution of some

of his problems; that EDP is practical for small accounts.

"Being largely a process of education, any publicity generated in this area is bound to have a beneficial result for all of the makers of small systems."

GE is meeting the competition from the System/3 head on with its Model 55.

This model has been available in Europe for about two years and was introduced into the American market in September, 1968. One year later, the one thousandth unit was sold.

Waple said, "The initial sales effort was directed against the IBM 1130 and the Univac 9200, with a satisfactory order rate.

"In July, 1969, at the time of the announcement of the System/3, there was a drop-off in orders.

"This proved to be the result of prospects waiting to see what IBM had to offer." Waple stated that the order rate since the System/3 announcement has increased to a higher level than existed before July.

He said, "This was largely due to the fact that IBM had introduced nothing new to the marketplace."

No Significant Threat

Univac, although in direct competition for the small, card-oriented installation, does not

feel the System/3 to be a significant threat to their 9200. The 9200 has a distinct advantage in pricing, which seems to be the most important single factor in this market, being 15.2% lower in cost than the System/3 for a basic card system. These figures are based on annual rental charges and include allowances for software costs and for training.

The lack of any communications ability in the System/3 is also considered by Univac to be a strong selling point for their 9200, which can be connected to almost any communications system.

The language repertoire of the 9200, with both Cobol and Assembler being offered in addition to RPG, is much broader than that of the IBM system. The 9200, moreover, is fully upward compatible with the 9300 and 9400, thus allowing the user to upgrade his installation easily.

From a price point of view, the System/3 has an advantage over the 9200, being 13.8% cheaper in the basic disk system using the Univac 8410 disk drive, and 6.2% cheaper in the high-performance disk configurations.

Univac feels that the cost difference is offset by the higher speed and capacity of their units.

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Harvard Men to Help With MIT's DoD Project

CAMBRIDGE, Mass. — Harvard professors will be permitted to participate in Project Cambridge, a controversial research project to develop computer techniques in behavioral sciences.

Project Cambridge is based at MIT and is scheduled to receive \$7.69 million over five years from the Department of Defense (DoD). But an amendment to the military procurement bill has raised questions about this funding.

The original proposal to DoD stressed applications in the areas of communism and unrest in underdeveloped countries [CW, Oct. 22]. Students and faculty at both MIT and Harvard protested against the project, charging that it would make it easier for the DoD to suppress popular revolutions in other countries.

Original Plan

Originally envisioned as a joint MIT-Harvard program, Harvard did not officially participate when the project began this sum-

mer. In response to the protests, the matter was referred to the Committee on Research Policy. Individual Harvard professors traditionally are allowed to accept funding from any source, so long as a few conditions, such as no classified research, are met.

The committee unanimously agreed to continue this tradition with Project Cambridge, and announced that decision Dec. 3, permitting Harvard faculty and students to begin participating in the project — as individuals.

But the committee only narrowly approved (11-8) official Harvard participation on the Project Cambridge Board, and that subject will be taken up by the faculty in January.

The committee reported that it "found no evidence for the claim that the kind of research proposed under the project was inherently 'immoral' or 'repressive.'"

Direct Military Relationship?

But the committee also reported that the research proposed is "basic research, unrelated to military programs except in the sense that such research relates to all programs involving human beings."

If that is true, then the DoD may be forced to cut off funding for the Project because of an amendment to the recently approved Military Procurement Bill.

That amendment forbids the DoD to fund "any research project" not having a "direct and apparent relationship to a specific military function."

Meanwhile, two Harvard participants in Project Cambridge

went to Washington last month to urge the National Science Foundation to help fund the project. NSF appropriates about \$11 million per year for computer research, \$300,000 of that in the social sciences.

Like a New Department

Questions about Harvard participation in the Cambridge project are not all political.

A half share of the \$7.69 million in DoD money would significantly alter the nature of the social sciences at Harvard. Dean Ford noted that "this is not unlike setting up a new department."

Yet the whole thing nearly happened without any faculty vote at all.

Harvard President Nathan Pusey decided that the Committee on Research Policy would define the university's position, and no faculty vote was needed.

But when the committee gave its report Dec. 3 "for the information of the faculty, not for action," some faculty members protested, and official Harvard participation will now be considered by the faculty.

Tone-to-Digital Patent Holder Dismisses Infringement Claims

BELTSVILLE, Md. — The president of Photo Magnetic Systems has revealed that the company has dropped its patent infringement suit against IBM, AT&T, and two other defendants.

Peter James said that his company had dismissed "without prejudice and without cost" the claim that the four companies had participated in infringing his patent on tone-operating, "telephone oriented, computer systems."

James noted that the dismissal of the suit would allow the company to devote all its energies and resources to the marketing of the "computerphone," but that the suit could again be lodged in the future.

The company president said that he still feels strongly that the four defendants had infringed the patent, but that success in licensing the invention with

other large concerns led to this possibly temporary dismissal.

IBM has denied any infringement in a technical reply, filed in U.S. District Court in Washington, D.C. IBM had been charged with making and marketing keypunch and audio response units with tone-to-digital conversion capability.

AT&T was charged, along with Western Electric, with making and using certain telephone sets (Touch Tone) which could function as key-operated frequency generators.

The fourth defendant was the Chesapeake and Potomac Telephone Company, charged with marketing a patent-infringing product, the Touch Tone telephone sets.

Photo Magnetic Systems sought compensatory and punitive damages totaling \$2 billion for the wrongful use of their

patent. In recent statements, the company has said that it is "amenable to granting a license to users" and is available to discuss the matter with any possible infringers.

The company had hoped to bring suit against a possible 300 users of Touch Tone telephone sets, if the sets were used to access a computer.

Meanwhile, two Harvard participants in Project Cambridge

Dr. Walter Hoffman, ACM Treasurer, Consultant, Dies After a Brief Illness

DETROIT — Dr. Walter Hoffman, professor and director of the computing and data processing center at Wayne State University, died Dec. 5, at Sinai Hospital following a brief illness.

A member of the WSU faculty since 1949, Dr. Hoffman was

named to the computing directorship post in 1958.

Before going to WSU, Dr. Hoffman was a statistician with the Children's Fund of Michigan, and a research assistant at the University of Michigan.

He served as a consultant in mathematics to the Oak Park School District and was a former trustee and president of the Oak Park School Board.

He received his B.A. degree in 1948 and an M.A. in 1949, both from Wayne State. He earned his Ph.D. in 1956 from the University of Michigan.

Dr. Hoffman was a member of the national Association for Computing Machinery, for which he served as treasurer, and was also a member of the board

of directors and treasurer of Afips.

Dick Tanaka, president of Afips, said of Dr. Hoffman: "Walter was not just a good worker for Afips, he was a wonderful human being. He knew how to enjoy life without being irresponsible about it. We're going to miss him."

Dr. Hoffman's other memberships include the Mathematical Association of America, Sigma Xi, Engineering Society of Detroit, and the American Mathematical Society. He was chairman of the committee on computer oriented mathematics of the National Council of Mathematics from 1963 to 1965, and a member of the National Academy of Science.

Students Allege Bias Slowing Approval

(Continued from Page 1)

Now, according to Cokas, the Colorado Commission on Higher Education (CHE) is attempting to throw out the college's evaluation and require the purchase of the 360/25 rather than the "preferred," and less expensive Century "200."

It is also alleged the CHE officials and the Administrative department, both of which must approve DP equipment purchases for education, have insisted that any new equipment

be "compatible" with the state's overall goals of centralization.

Cokas has been unable to obtain a satisfactory interpretation of "compatible" in the state's terminology, except that it apparently means that "all colleges and universities who do not have computers are going to get them."

IBM Got "Tentative Orders"

Administrative Director Sandberg denies the bias charges, but does admit placing "tentative

orders" with IBM before sending out the required "requests for proposals" — the first step in the state's procurement procedure. These tentative orders, called "letters of intent to purchase," were supposedly forwarded to the manufacturer only to assure prompt delivery, if IBM hardware was selected.

But students contend that nobody at the college wants the IBM 360, and further, that the NCR Century 200 would have been available even without issuing any "letter of intent."

They claim an official of CHE used pressure to get IBM a letter of intent, even though the college had decided on the Century 200.

The official in question is F. Parker Fowler, who studied for his doctorate at the University of California under an IBM grant.

Fowler says that CHE only "recommends" compatibility, but does not tell the institutions what to buy.

An IBM spokesman said that the company had found "strong competition" in Colorado, and that IBM feels the state has followed the "highest ethics" of business conduct in awarding contracts.

IBM has by far the largest number of computer systems in the state, although the largest single unit was manufactured by Control Data.

(Continued from Page 1)

With only 1,300 installations currently using outside software, this would require a minimum return of \$50/user, plus the overhead of marketing, sales, and support. This assumes everyone currently using outside software bought the compiler.

With a more reasonable installation rate of 20 compilers, the company would have to charge each user about \$2,500 to recover expenses, with no profits.

At IBM's prices, the user could use the Cobol compiler for about five years without spending that much money.

An IBM spokesman told CW, however, that the reason for the low price of the Cobol compiler was largely due to the conven-

tional compiler being in the public domain, (because it had been announced prior to June 23, 1969, the date IBM unbundled).

He said that the price of the new compiler was set to offset the cost of adapting the older version to the new time-sharing system.

The TSO package is scheduled for release early in 1971, and the ITF package for release during the second quarter of next year, according to IBM.

Commenting on the release dates, Dr. T. A. Dolotta, president of Princeton Time-Sharing Services, Inc., said, "Based on [my] experience, it will probably be the first quarter of 1972 before it works. OS/360 took 2½ years before it worked properly. As a long-time IBM user, I'm from Missouri".

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Patent or Copyright: Part II

Unprotected Programs Could Become Trade Secrets

By Edward J. Bride
CW Staff Writer

WASHINGTON, D.C. — If computer programs aren't given some form of protection, the industry will risk a slowdown in development, or the user will risk the unavailability of programs as "trade secrets."

This opinion represents the majority of the replies to a Patent Office request for ideas on the patentability of computer programs.

The consensus was that some sort of protection is "vital" if software advancement is to continue at any reasonable pace, but the suggested methods of protection were quite varied.

Manufacturers had widely divergent views, as did the other categories of respondents. Avoiding trade secrets was a primary concern of those advocating protection, but there was disagreement as to whether patenting or modified copyrighting was the correct course of action.

IBM has suggested that current patent law sufficiently covers computer programs, and proposed a detailed registration system [CW, Feb. 26]. The IBM plan would forbid unauthorized copying, translating, use, or transfer of physical possession of a registered program.

IBM says its system would "facilitate and encourage the timely dissemination of new concepts in order to foster a continuing advance in the state of the art."

Patent specialists from Burroughs and General Electric agreed that any needed protection could best be given through the patenting of programs, although Honeywell suggested that copyright would be most appropriate.

New Program Patent Class

G.L. Kensinger and Mervyn L. Young, of Burroughs' Paoli patent operations office, proposed a new examined Program Patent Class. They suggested that programs *per se* are not presently patentable, but called on Congress to come up with a new form of patent.

They cited "new and unobvious" computer programs as important to the economy, and said that patent protection would "decrease motivation for maintaining secrecy."

They added that patent protection would "promote progress and competitive development" of the "useful arts" of programming and operating general purpose computers.

GE's information systems division patent counsel, George V. Eltgroth, presented his views in the *Patent Law Annual*.

He stated that patent protection should be available for "intellectual contributions expressed in the form of programs, if suitably supported by a showing of the hardware organized by the program."

Eltgroth agreed with many other respondents that relatively few program inventions will meet the criteria for patentability.

These criteria, as suggested by Burroughs' Kensinger and

Young, would be mainly the "novelty and unobviousness" of proposed algorithms.

"Broaden" Copyright Law

Honeywell corporate patent counsel Henry L. Hanson is satisfied that protection will be afforded by present and proposed copyright law. He stated that the (copyright) law needs to be broadened in the realm of enforcement.

Despite possible business ramifications of IBM's imminent unbundling, software houses were lightly represented in the survey (or they responded but did not wish to publicize their sentiments). Since IBM's programs will no longer be "handed out" with hardware, any legal protection given computer programs will, as one observer put it, be a "Magna Carta for the software companies."

Because of the diverse interests of the TRW Systems Group, their reply was reviewed in the users section. Two other major companies agreed that some sort of protection was needed, although proposed methods differed sharply.

Applied Data Research said that protection could be internally provided by the industry, although it did contend that current patent law does apply to software.

ADR proposed a 4-8 character "electrical combination lock" in read-only storage. If the proper combination (such as the CPU's serial number) were not entered, the program would not perform correctly, or it would terminate.

Thus, remuneration would come through enforcement of the patent, while any further protection would be afforded by the "electrical combination lock."

Infotran favored the copyright system, claiming the patent form of protection was neither enforceable nor helpful for "a healthy development in the computer industry."

Several patent attorneys replied, and the various suggestions ranged from special patent legislation to the claim that such protection would be unconstitutional.

None suggested copyright, al-

though the Chicago Bar Association did say that any proposed "special protection" might be afforded through changes to the copyright system.

French Reply

A reply from France claimed that American programmers would have an unfair advantage if the U.S. disallowed the patentability of programs while a small European country established this form of protection.

Jean Lecca, of Paris, said such a small European country would be handicapped in international competition, if U.S. firms could protect their software overseas,

but would not afford the same type of protection here.

John D. Haney, of Akron, Ohio, called for a broad study of "unpublished technical data" not restricted to the "typical computer program."

Albert Kramer, of Washington, D.C., said that any form of protection would be a hamstring to the industry, especially since programs are such "nebulous subject matter."

Philadelphia lawyer Morton C. Jacobs, of Jacobs and Cohen, said that the granting of exclusive rights "by way of registration of computer programs" would be unconstitutional.

OPERATE IN REAL TIME

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LA Registrar Suggests "Observers" to Prevent Fraud

By Edward J. Bride
CW Staff Writer

LOS ANGELES — After hearing both sides of the story regarding the integrity of IBM's Votomatic system, the Los Angeles County registrar of voters has decided to set up a permanent committee of election observers to guard against fraud.

Emphasizing his confidence in the computerized vote-counting system which has drawn much controversy here in recent months, Registrar-Recorder Ray E. Lee said his committee would catch any attempt at "intentional alteration" of the program.

Recent testimony before the county Elections Security Committee has seen widely divergent opinions. Some computer experts have called for withdrawal

of the system and suspension of its use, citing their ability to "rig" elections in a "war games" environment, and to have this rigging go undetected.

Other experts have said that any intentional varying of election results would require collusion from within the state election organization, and that any system was subject to such tampering. No system — not even a computerized system — is completely immune to such tampering, they claim.

Half Qualified in DP

About half of Lee's 100 observers will be qualified data processing personnel, and will participate "in every phase of the computer work" on election night. They will also observe the sealing of each phase of the

program as testing steps are completed and approved months before the elections.

Lee said that the participation of outside volunteers in election vote counting should "reassure the public of the accuracy of the count."

Lee said he would propose new legislation to discourage anyone tempted to "bribe personnel working with computers to manipulate the vote count in California."

The bill would provide for a public recount of certain precincts, to be witnessed by political parties, candidates, and any other groups affected.

The precincts would be selected from random sample tables, or could be designated by the parties or candidates. He said that closer races would be most

likely to be recounted, since the manipulation of a small number of votes could change the outcome.

Conversely, Lee added, "there seems to be little need to recount a race that ended as expected, according to past elections, and to the political registration of that area"

The system was recently defended by IBM Systems Engineer William Kanaga, who said that the "ultimate guarantee" of the integrity and security of the election "rests in the integrity of the registrar of voters and his staff," and in their security measures.

He claimed that, without collusion of the registrar or his staff, it would be "virtually impossible" to subvert the system [CW, Nov. 26].

Rigging "Almost Impossible"

Los Angeles County Data Processing Supervisor Henry J. Foster agreed with Kanaga that it was "technically possible" to rig any system.

However, he also agreed that the tampering would "probably" be detected, without collusion from his data processing staff or the registrar-recorder's staff.

Foster added that some "data processing oriented" observers would be "deterrents" against rigging, concluding that it would

be "almost impossible" to alter the Votomatic system without collusion.

Other defenders of the system have included Kenneth Hazlett, vice-president of Computer Election Systems, Inc. As an IBM programmer, Hazlett designed and supervised the writing of all Los Angeles County vote count programs and supervised their testing and implementation.

Calling present control adequate, Hazlett suggested that security might be improved by the "recounting of a statistical sampling of precincts which, if possible, have been selected by the major political parties."

Hazlett, too, emphasized the need for collusion, and charged that those criticizing the system were "well-intentioned but not well-informed."

Other testimony favorable to the Votomatic system was heard, with most witnesses agreeing that impartial observers and the integrity of public servants would assure the accuracy of the vote count.

The additional witnesses included William Below, president of Databab Computer Co.; C. Howard Wilson, chairman of the county Data Processing Committee and president of the C. Howard Wilson Computer Co.; and Claude F. King, president of Logicon, Inc.

Communications Equipment Makers Form Trade Group

By Ronald A. Frank
CW Communications Editor

MOUNTAIN VIEW, Calif. — Concerned data communications equipment manufacturers have formed a non-profit trade association to protect themselves against what a spokesman called "the oppressive practices of the Bell System." The organization will be known as the Data Communications Association.

According to information given to CW, the association will "very promptly" present position papers regarding current communications tariff questions, and will file "at least one and possibly two new complaint proceedings [before the FCC] unless Bell is willing to discuss [the questions involved]."

In acknowledging the formation of the new organization, Ray Jacobson, president, said the association was formed during the recent Fall Joint Computer Conference at Las Vegas. He added that the DCA will operate as a non-profit corporation, "formed to enable member companies to do a better job of serving the users of data communications equipment."

When asked whether data users would qualify for membership in the DCA, Jacobson said that users could join as associate members with non-voting privileges, although full membership will be available only to communications manufacturers and distributors.

Establish Standards

He said that the association would serve as a clearing house for disseminating information to its membership on the practices

of the communications common carriers.

In addition, he said the DCA plans to actively promote the establishment of both technical and quality standards within the data communications industry.

Jacobson revealed that eight manufacturers of modems, couplers, and related data communications products had agreed to form the DCA in order to provide a means for challenging some of the communications policies being advocated by the Bell System.

When asked to elaborate, he said that the DCA would specifically challenge the right of the Bell System to compete for certain markets with commercial data equipment manufacturers.

The DCA reportedly plans to contact the Federal Communications Commission regarding current plans of the Bell System to introduce certain user-oriented data communications equipment early next year.

A DCA spokesman told CW that the association will seek to use the good offices of the FCC to initiate formal meetings with the Bell System.

These meetings, if held, would presumably deal with the claim that common carriers such as Bell enjoy an unfair competitive advantage over commercial manufacturers in the marketing of certain data communications equipment.

Jacobson said that communications manufacturers and users interested in learning more about the DCA can contact him at Anderson-Jacobson, Inc., 2235 Mora Drive, here.

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Editorials

'Why The Computer Professional?'

The "computer professional" concept seems to offer the only feasible solution to insure both company data security and employee performance.

Creation of a professional society, similar to the one for certified public accountants, would offer companies a chance to: (1) ascertain that a potential employee was bonded in his trade and thus able to insure a company against damages resulting from improper data management, and (2) prove that a potential employee has reached at least a minimum level of proficiency in skills such as systems analysis, programming, and information systems design.

The DPMA examination for the certificate in data processing does not, by any means, offer proper certification. Most other examination systems in use today are only for measurement of "potential," rather than existing capability.

Licensing, that controversial idea, enters the arena at this point. The Japanese have already seen fit to institute a licensing system for their information processing engineers, and perhaps a federal agency in this country should enter the fray, with suitable industry guidance.

State or local certification does not offer a suitable alternative because of the need for uniform standards nationally.

It is important that the computer people begin action in this area immediately. Otherwise, the federal government, with all its millions invested in data processing, may simply go ahead and establish inadequate or improper standards without proper guidance from the profession.

Patent Law Changes??

Computer and noncomputer people are being pretty casual in their suggestions for changes in the patent or copyright systems just to enable them to protect computer programs.

The copyright system, never intended to protect novel ideas or processes, was, instead, intended to provide some limited protection to artists, composers, and writers in obtaining recompense for the reproduction of their work.

Several hundred years went into the formation of the body of laws governing copyrights, and a drastic change in the nature or scope of the laws would present serious potential dangers to the entire system.

The patent laws, while of slightly more recent vintage, still have been refined for a couple of centuries in the British courts. The American courts felt that the existing patent laws were sufficiently well-founded to include the patentability of properly phrased computer programs in the form of algorithms.

The patent laws serve an entirely different purpose from the copyright laws, in that they provide legal recourse against anyone who uses the results of someone else's work without proper license and recompense. The greater strength of the patent laws is necessitated by the larger investment in time and money generally involved with the development process, not to mention the money necessary to obtain the patent — a much more expensive and difficult process than copyrighting.

It is highly dangerous to play with laws that have been developed for specific purposes to bypass a new and unanticipated problem.



Census Taker and Friend

Letters to the Editor

Manuals Should Be Done

By Professional Writers

Congratulations to Susie Secretary (Oct. 29) and Esther T. (Dec. 3) for their efforts in bringing to light the need for more usable manuals. Too many users tolerate such manuals without pressing the supplier for better documentation.

Documentation of a product and its use is becoming a more important part of software products with the advent of time-sharing. No longer is documentation a matter of a development programmer communicating to an applications programmer. Suddenly, the supplier must communicate to noncomputer-oriented people, and most programmers know their subject too thoroughly to communicate to nonprogrammers.

Professional computer-science writers who have the know-how and the patience to produce usable manuals are available, so why should the suppliers expect a professional programmer to know how — or take the time — to present instructions to a predetermined audience?

So kudos to those two girls whose comments may well be the harbingers of a movement toward usable documentation.

E.A. Maguire
Vice-President
Technicom Corp.
Phoenix, Ariz.

Deadline Changes Without DP Knowledge Useless

In the Dec. 3 issue, Peter Carr's article on the delay of Social Security increases due to "programming problems," points out that many times, deadlines are established by individuals who do not understand the complexity of changes to computer oriented systems. It appears fairly simple to pick an effective date for any change.

However, it becomes far more intricate when the change involves computer programming and will continue to be even more so as systems develop in size and scope. It is apparent that deadline changes cannot be made without involving someone with the knowledge of what this change will mean in the data processing area.

Jerome E. Schueler
Data Processing Manager
Rockwell-Standard Co.
Oshkosh, Wis.

Frame of Mind Can Make Things Get Worse

The major strength in the computing field, I feel, is that the people are oriented to problem solving. You are not able to do an effective job in an era of vitality and change when you have H.R.J. Grosch's motto, "It is possible for things to get continually worse without limit" hanging on your wall.

Things always seem to get worse for those who think they are going to get worse.

The message Mr. Grosch should be imparting is, "Don't be a problem finder — get involved in the solution. The ability to succeed is in direct proportion to your frame of mind."

Richard B. Bagby
President
Intermac Corp.
Rochester, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Viewpoint: Shades of Big Brother**Data Files Greatly Threaten Individual Privacy**

By Joseph Hanlon
CW Staff Writer

SHERMAN, Conn. — "The census taker now has a computer with fangs lurking behind him," declared Nancy Bruff, co-chairman of the National Committee for a Fair Census.

The group is protesting the fact that the 1970 census will have 177 questions, more than ever before, including questions such as "Do you have a bathtub or shower and is it shared with another person?"

"The census bureau wouldn't need all of these questions if they didn't have a hungry series of computers behind them," charged Miss Bruff. "And what's more, should anyone refuse to answer any of these questions, they are subject to 60 days in jail and a \$1,000 fine. That's why I call it a computer with fangs."

Sen. Ervin Agrees

Sen. Sam Ervin (D-N.C.) agrees with Miss Bruff, and he has sponsored legislation to repeal the penalties and to regulate the census and other surveys. He has also proposed that a new agency be set up to regulate computer-related surveys.

But Ervin sees the problems as being much broader than the decennial census. He declared that the computer makes it possible to distribute questionnaires "on a scale beyond the researcher's wildest dreams," and that "because of its great computer systems, the Census Bureau is sending out forms" for many other federal agencies.

"In the past three years the Census Bureau alone has conducted 87 voluntary surveys for 24 other agencies that covered over 6 million people," he declared.

One such survey was a 15-page form sent to elderly, disabled, or retired people by the Department of Health, Education, and Welfare.

It included questions such as: "Would you say you are very happy, pretty happy, or not too happy these days?" and "Do you have any artificial dentures?"

This survey was voluntary, but that fact

was never mentioned to respondents. That the survey was voluntary was further obscured by the fact that if the person failed to answer the survey, he received a second form by certified mail, then a phone call, and then a visit from a Census Bureau employee.

Finally, Ervin charged that "several sets of tapes were made of the responses and stored in several different places; in one location, apparently forever."

Job Applicants Queried

Ervin is also concerned about invasions of privacy in the questions that many job applicants must answer. "We frequently see pressure applied to applicants for employment who are forced to subject themselves to wholesale invasion of their personal privacy because they need a job.

This is particularly true in private business. The data disappears into the labyrinth of computers and as the person moves from job to job throughout an industry, the computer surveillance continues, facilitated by the network of interfacing computer systems," he said.

Regulatory Agency

Ervin's solution to the problem is "an independent regulatory agency to control this new communication-surveillance system."

Marsha MacNaughton, an Ervin aid, said that no legislation would be proposed on this in the near future because it requires more study.

But Ervin has proposed two bills to regulate surveys and invasion of privacy. His bill on surveys (S 1791) would:

- Abolish all criminal penalties from surveys, except for questions in the decennial census actually related to counting people.
- Make voluntary all other surveys, and require that the questionnaires are clearly marked "voluntary."
- Define areas in which questions cannot be asked without specific authorization from Congress, and
- Set up some sort of questionnaire review policy.

Another Ervin bill (S 782), cosponsored

with 54 other senators, would define areas in which the federal government cannot ask questions of its employees or prospective employees.

Agency to Be Established

It also would set up an agency to hear privacy invasion complaints from federal employees.

A similar bill passed the Senate in 1967, but died in committee in the House.

Both bills are currently being considered by Ervin's Constitutional Rights Subcommittee, and will probably be reported out early next year.

The 1970 census begins April 1, so

Senate and House action would be required before then to have an effect on that census.

The House has passed a bill to eliminate

the prison term from the penalties for failing to answer census questions. That bill is now being considered by the Senate Post Office Committee. It does not contain any other provisions of the Ervin bill, however.

Nancy Bruff said that she and some members of her committee would be in Washington this month to talk to senators to encourage their support for the Ervin bill.



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new products



Univac DCT 1000 Data Communication Terminal

Univac Data Subsystem Permits Interface Between Univac 9000 Series, IBM 360s

PHILADELPHIA — A buffered terminal and a communications subsystem have been announced by Univac division, Sperry Rand Corp.

The communications subsystem, called the DCS-IC binary synchronous data communications subsystem, will permit binary synchronous code transmission between Univac 9000 series computers and the IBM 360 series. It is compatible with the IBM 2701 data adapter unit and a synchronous data adapter type II, according to Univac.

The DCS-IC, which will be available either as an integral attachment or in a free-standing cabinet, may be used with USA-SCII or EBCDIC codes; in trans-

parent or non-transparent mode; and with multipoint, switched voice grade, or Telpak lines. The units will be provided with software to support BTAM and QTAM, the IBM communications software, Univac said.

Typical units used with the 9000 in a multipoint network will lease for \$350 per month and sell for approximately \$13,920. Deliveries begin in November, 1970.

The DCT 1000 terminal is a buffered unit and can operate in either a remote batch or a conversational mode at up to 4,800 baud over switched or private lines, the firm said. The unit's speed is said to be two or three

times faster than competitive equipment.

In basic configuration the DCT 1000 consists of an asynchronous, I/O printer with 132 print stations (operating at up to 30 char/sec), a control unit and a keyboard.

Three optional I/O devices may be added to the system in any combination of card readers, paper tape readers and punches, and card punches. The unit is compatible with the firm's Uniscope 100 CRT display and multiplexer.

In operation, data characters are printed as they are entered into the buffer memory to facilitate visual verification and correction of data before transmission. The unit features automatic error correction, according to Univac.

Scheduled for July, 1970 delivery, the basic printer, control unit and keyboard will rent for \$140 per month and sell for \$5,300.

Univac's address is P.O. Box 8100 here.

Computer Output Microfilmer Unit Inputs 360 Tapes

SUNNYVALE, Calif. — A new company, Peripheral Technology, Inc., has announced a computer output microfilm (Com) unit priced to sell for "under \$50,000."

Com is used as a permanent storage medium for large quantities of library-type data, such as retention of payroll records.

The PTI 1300 takes input from 800 bit/in. tape prepared in IBM 8-bit EBCDIC format, and outputs on 16mm film in standard



7200 Graphic Plotter. It's available through time-share services. Call and learn how simple it is to plot computer-resolved problems — points, curves, circles, lines, ellipses, contours, bar or pie-charts. You name it. Look into expanding your time-share capability. Any time-share service that hasn't heard about the 7200 should talk to us.



The new time-share terminal, Hewlett-Packard's answer to the graphic time lag. HP's graphic terminal picks up where the Teletypewriter leaves off and provides a revolutionary new capability: in-house graphic plotting of all time-share computer data. Instantly. Accepts time-share EIA ASCII inputs from the Teletypewriter.

The HP 7200 Graphic Plotter generates visual presentations of mathematical and engineering functions, no matter how sophisticated. Or it plots business computations like bar graphs and pie charts. It can spot a trend, prove a theory, compare data, generate engineering designs. It lets the time-share user get more use out of a

terminal because he can get more use out of the numbers. He instantly comprehends typewritten data in smooth, clear plotted form.

HP's versatile new Terminal for time-share systems plots points or lines. Each data point is defined by its X-Y coordinates and the 7200 is a vector plotter, plotting absolute coordinates from all inputs. The position of the plot is adjustable and any preprinted grid or blank paper can be used. No special training is required to operate the 7200.

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1300 Microfilmer

line printer format, 132 char/line, 64 line/in.

Its rated speed is 13,000 line/min. Throughput is between 156 and 500 page/min, the company says.

The standard character set has 64 gothic symbols, but is expandable to 128. Other standard features include the selection of individual files from a full reel and vertical tabbing.

The user can optionally have forms display, image retrieval, and 7-track tape.

The company is currently offering 60-day delivery, and the pricing includes a tape drive, the firm said.

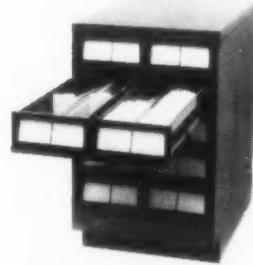
Peripheral Technology, Inc., 757 N. Pastoria Ave.

dp accessories

**Work Trays Fit
IBM System 3
Punched Cards**

BINGHAMTON, N.Y. — Work trays to accommodate the 96-column punch card utilized in the IBM S/3 are available from Systems Manufacturing Corp.

Card file tray conversion inserts are also available to convert standard 80-column card trays,



Ten-Tray File

thus doubling capacity, according to the company. Conversion units are available for this company's card files as well as those of other manufacturers. The company also manufactures cabinetwork to complement the trays.

The price of the trays range from \$5 to \$7 each. The conversion inserts are \$9.50 each. A five-drawer ten-tray file with inserts, converting the unit to a 20-tray file, is priced at \$213 without lock and \$231 with lock.

Delivery is one to three weeks. Systems Manufacturing Corp. is located at 13 Broad St. here.

**Platen for OCR
Typed Data Has
Pin-Feed Control**

DAYTON, Ohio — A platen has been developed for typed optical character recognition data as well as for normal continuous multicopy business forms preparation.

Called the Registrar platen, the device incorporates The Standard Register Co. pin-feed control. Through use of the pin feed, the typist can exercise "hands off" control in feeding and aligning the succeeding forms for typing entries once the first set of a continuous form strip is in position on the platen, according to The Standard Register Co.

Included in the model line are units specifically applicable to the following typewriters: IBM Selectrics and the 11C and 11D models, the Friden 2200 and 5000 series, the Dura Mach 10 and the Olivetti Underwood Editor 2.

The price depends on the machine used, the size of the platen and ranges from around \$100 to \$115. Delivery is two weeks.

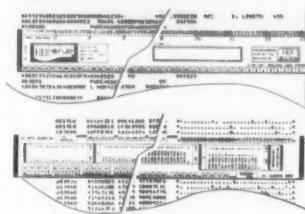
The Standard Register Co. is located at 626 Albany St.

**Third Generation Rule
Aids Printout Analysis**

HOUSTON, Texas — A rule for programmers is being offered by Hexco Inc.

The Hex-A-Rule features appropriate scales and reference data for the third generation user. The rule facilitates analysis of hexadecimal computer printouts. The 13-1/2 in. rule is deep acid etched and made of heavy stainless steel.

The price is \$5 each for pre-paid orders. Personalization is available for an additional \$1.50.



Hex-A-Rule

The address of Hexco Inc. is P.O. Box 55588.

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Display system presents static and real-time data on projection screen.

Real-Time System Projects Information In Text, Graphics, and Analog Displays

SAN DIEGO, Calif. — A display projection system said to be able to present masses of changing data continuously is now available.

The Stromberg DatagraphiX-developed 2220 display projection system uses a charactron tube to project high resolution computer-generated information on a wall-sized screen in text,

graphics and analog displays. The newly developed cathode ray projection tube is 100 times brighter than the conventional charactron tube used in standard DatagraphiX display systems, the company claims.

Originally designed for both industrial and military management information systems, the charactron process produces

minute characters and lines on a tube face. This data is then projected by means of a reflective optical system onto the screen. Coupled with the appropriate software the tube displays information at a rate of about 50,000 char/sec, the company says.

New Products

Possible applications of the system include the displaying of stock market quotations, monitoring police car movements, country-wide information systems for trucking lines, and information systems in hospitals, according to a company spokesman.

The display system is comparable in price to an IBM display system costing \$80,000, he said.

In about a year, development of the system will allow sales management groups meeting at remote branch offices to display on a wall-sized screen any performance data stored in a company's computer headquarters 3,000 miles away, according to the developer.

The address of Stromberg DatagraphiX Inc. is P.O. Box 2449.

Key Punch Can Communicate Via Data Lines

OLD GREENWICH, Conn. — A portable keypunch machine capable of receiving output signals from an external source is being offered by Varifab Inc.

Designated the Vari-Punch Model 403 (punching only) and the Model 404 (punching and numeric printing), the device is designed so that additional I/O devices can be incorporated into the basic Vari-Punch machines, according to the company.

An external connector is provided on the back of each model to receive output signals from other devices. All control keys including tab, space, hold, and return may be operated by remote signals, according to the company. The Vari-Punch can punch and transmit by data phone or other on-line devices.

The basic Vari-Punch will punch and print numeric information on any standard tab card or a snap-out card set containing a tab card as well as duplicate copies. It gathers information at the point of origin and, through a simple operation, captures "input" for data processing.

The Vari-Punch has an all electric keyboard, and the unit may be programmed for as many positions of the 80-column card as desired. The device utilizes a "funnel feed" method of manual card insertion, along with an electric tray for loading and unloading of the card tray. Punching and printing speed is said to be 13 columns per second.

The Vari-Punch Model 403 sells for \$675; the Model 404 sells for \$769.

Varifab Inc., a subsidiary of Condec Corp., is located on the Boston Post Road.

Make your best computer better.

Computer Entry System's Series 6000 keyboard-to-magnetic tape system improves performance of your total EDP setup by reducing key punch data preparation time by 35%.

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301 622-3350



GE Adds User-Oriented Features to Mark II

PHOENIX, Ariz. — A series of application-oriented features called "the most extensive user-directed improvements ever made," have been added by General Electric to its Mark II time-sharing service.

Included in the list of new capabilities are extended file

storage, abbreviated system and programming commands, and expanded text-editing functions.

The abbreviated commands should allow the customer to accomplish his work in significantly less time and with reduced costs, the company says.

Both sequential and random

access binary files, which enable users to establish data base research programs, have been introduced. Specific record selection is easily achieved, the company says, through the use of random files.

As many files as desired may be stored, with the maximum

capacity, for ASCII files, of 320,000 characters. Binary files may handle up to 78,000 words, the firm claims.

File sharing control, and management commands have also been added. These commands are intended to provide better file security control, and permit selective program and data access to any desired group of users at the initial developer's option.

Editing Functions

Character manipulation and text-formatting capabilities have

been added to the text-editor package, the company says.

Reports, tables, letters, and other typical textual material can be prepared more easily and directly from rough drafts that can be stored and edited on the Mark II system, the firm says.

Both upper- and lower-case typewritten material on either the GE Terminate 300, or the Friden 7102 terminal can be used freely, according to GE.

Information is available from the company's division headquarters at 13431 N. Black Canyon Highway here.

Ultra-X Prices Computerized Typesetting at 25 Cents/Page

PRINCETON, N.J. — A software system that will provide complete computerized typesetting and composition, at a claimed price of 25 cents per page produced, is being offered from

Pica Data Systems here.

Ultra-X, as the package is called, can be set up for either in-house installations, or for service bureaus when the customer cannot afford the computer equipment necessary to justify the system, the company says.

When the package is installed off-site, Pica will train the necessary personnel in its use, they say.

This arrangement also allows companies that are considering in-house equipment to have an opportunity to evaluate competitive equipment, prior to making a significant investment.

The programs that make up the package are claimed to be completely compatible with IBM Service Bureau Model 360s that have at least a 64K memory.

The magnetic tape output will produce full-page composition on any electronic composing equipment, the company claims.

Supported composers include the RCA Videocomp, the Harris-Intertype Fototronic, the Mergenthaler Linotronic 505, and the Photon 713, the company says.

It's A Language!

The system is actually a language consisting of 100 two-letter words. These two-letter codes are simply abbreviations for such terms as point size (PS) or paper width (PW), and permit large improvements in copy preparation and production, according to the developer.

Designed for the S/360, the package offers the ability to handle as many types of layouts as might be desired, any fonts, and any combination of type styles, the company says.

The system is available from the company's officers here at 228 Alexander St.

Judy Does Fourteen Functions for \$10

FORT LEE, N.J. — A program performing 14 common utility functions for the Univac 9200/9300 is being made available for a \$10 postage and handling charge by Data Usage Corp.

Called Judy (just a useful device for you), the program executes data conversion functions associated with card, tape, and printer. Minimum memory size is 16K.

One function, the ability to combine many data files into one, is not readily implemented with standard Univac software.

according to the company.

Utility functions performed by Judy are 80 column card to tape, card to tape blocked, card to tape with right-side truncation, 80 column card to card, tape copy, tape to tape with reblocking, combining tape files, tape to printer (Hollerith, EBCDIC, and Hollerith and EBCDIC), tape to card (Hollerith, and Compressed Code), write tape mark, and skip tape forward specified number of blocks.

Data Usage Corp. is located at 2460 Lemoine Ave.

Beef 2 Handles ASCII and EBCDIC on 1108, RCA 70

BETHESDA, Md. — Beef2, a language extension utility system, has been made available for the Spectra 70 and Univac 1106, 1107, 1108 computers, for use with 1108 Cobol and 1108 Assembler Language operating under both Exec2 and Exec8 systems.

Computation Planning Inc. calls its new packages Beef2/70 and Beef2/1108.

Beef2 provides highly generalized bit, character, and word group movement, packing/unpacking, decision-making and searching; variable-significance IF statement capability; character set and sequence transformations; and convenient numeric data conversions.

Beef2/1108 offers 1108 users a way to deal with ASCII, EBCDIC, and other codes, in addition to the 1108's natural Fielddata code.

The Beef2/1108 exists in a 6-bit form and in a 7-, 8-, 9-bit form. The two forms are usable

together under the same system, the firm says.

The price for a single version of either form is \$4,750 including installation. The two forms together sell for \$5,250 including installation. Beef2/70 sells at \$4,750.

The single version leases for \$100/mo plus \$750 for installation. The double version leases for \$110/mo plus the installation charge. Delivery is one week, the company claims.

Computation Planning Inc. is located at 5401 Westbard Ave. here.

Mark IV Adds Indexed File Feature

SHERMAN OAKS, Calif. — An extended version of the Mark IV file management system has been made available by Informatics Inc.

Mark IV, a general purpose product that is said to simplify management information processing, has been modified to include two features — indexed coordinated files and Sterling processing. The indexed coordinated file feature allows multiple files using the IBM indexed sequential access method (ISAM) to be read randomly using keys

to select specific records from any file. The Sterling processing feature was developed for processing files containing Sterling currency data in the United Kingdom.

The new version is known as Mark IV/2 and will replace the previous version at no additional cost to existing users. The system operates in either DOS or OS environments on the IBM 360/25-91.

Informatics Inc. is located at 5430 Van Nuys Blvd. here.

Order-Flow Controls Data From Entry to Billing

WALTHAM, Mass. — A system designed to automate the flow of information from order entry, through distribution and credit check, into shipping and billing procedures has been made available by Data Architects Inc.

Designated Order-Flow, the system is installed with the equipment and programming tailored to the work-flow requirements of the customer. The company is said to provide full service support, training, conversion, and maintenance.

Order-Flow is a real-time online system that includes the Digital Equipment Corp. PDP-8/L, 8-12K of core memory, disk memories expandable to 524,288 12-bit words, high-speed printer, magnetic tape, I/O interfacing, and up to 20 teletypewriter consoles.

As orders are received by the system, an account number is attached to an order, along with any special pricing or billing instructions. This information is then entered into the computer through a keyboard through a question/answer format to facilitate entering of all information.

Dosrelo Uses JCL With IBM 360 DOS Operations

LOS ANGELES — A software package, called Dosrelo, is available to make application programs self-relocating with no programming effort.

Dosrelo is said by its developer, Boothe Resources International Inc., to eliminate the special programming presently required for Assembler Language programs and the requirement of cataloging the same program several times in a core image library.

Dosrelo functions under the IBM 360 DOS environment with 24-26K and requires one set of JCL statements per program. The program supports BAL, RPG, and Cobol. It does not support overlays, common areas, PL/I, or Fortran.

The program reads the problem program, generates an output card deck, and combines the output card deck with the problem program with a base address

The computer then automatically processes a credit check on the purchaser and alerts the credit department if a marginal situation exists.

If the system sanctions credit approval, a check is made into inventory availability. A back order is made if a certain product is not available.

If available, the stock is subtracted from the finished goods inventory and the shipping room is notified. After the shipping room has "picked" the order, confirmation is made so that billing will reflect what is actually sent.

Up to 20 consoles can be added to the system to input additional information to the PDP-8/L.

The purchase price of the system is about \$150,000 for a completely operational system. This includes hardware, software, installation, and training. Leasing arrangements can be made. Delivery is four to six months, the firm said.

Data Architects Inc. is located at 213 Third Ave.

Upcoming Software Supplement

Computerworld is currently preparing a special supplement on software programs, application packages, and systems software.

Any information regarding user reactions to various packages, problems, successes, and general comments on any such products will be welcome.

Please send material to: Peter L. Briggs, c/o CW.

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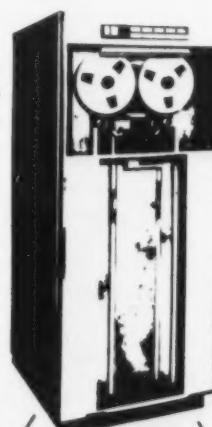
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Time-Accounting Services for Law Firms Keep Reports on Attorneys and Clients

Two time-accounting services are being offered to aid law firms in keeping reports on individual attorney activity and client billing.

One of the services, Lawpac, is available in the Cleveland area from Central Data Systems, and an interactive time-accounting system is offered for firms in southern California from Intranet Industries Inc. Both companies are expanding their services for national coverage.

Lawpac, developed by Central Data Systems, provides time accounting and client billing for medium- and large-size law firms. The basic reports produced with Lawpac are: an attorney hours summary (with chargeable and non-chargeable time), case review, analysis of attorney activity by type of matter, and client billing review (summary and integration of work for all clients).

Optional reports available are service reports, accounts receivable, revenue distribution, and proprietary attorney reports with effective hourly rates.

The package can be modified to accommodate economically a number of small firms or individuals.

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Optional reports available are service reports, accounts receivable, revenue distribution, and proprietary attorney reports with effective hourly rates.

Central Data Systems is located at 2800 Superior Avenue, Cleveland.

Time-Accounting System

Intranet Industries' law ac-

counting service may be used by firms with five or six attorneys as well as by firms with 100 or more attorneys, according to a company spokesman.

Reports supplied by Intranet's interactive time-accounting system include the time a lawyer spends on each legal matter for each client and reimbursable costs.

The firms are on-line to Intranet's computer (a Univac 1108) and can obtain up-to-the-moment accounting information whenever desired. Users type requests on a terminal that reportedly will be answered in a few seconds via a teletypewriter, IBM 2741, a CRT or like device, according to the company.

The service is provided from Intranet's computer centers via telephone circuits connected to terminals on the user's premises. At the beginning of 1970 the service will be available to firms in southern California. By mid-year the service will be available nationally, according to a company spokesman.

The charge varies and is based on the number of attorneys in a firm, according to Intranet. The firm is located at 9841 Airport Blvd., Los Angeles.

Fast-1 System Joins General Purpose Programs, Cobol Program Generators

LOS ANGELES — A general purpose information retrieval, reporting, and analysis system that combines general purpose programs and Cobol program generators is available from Ancom Systems.

Called Fast-1, the system retrieves selected data from computer files, computes answers to calculations, creates new files of selected or condensed data, sorts information into desired sequence, reports information in tabular reports of the user's own design, and analyzes the data by submitting it to comprehensive mathematical analysis.

Fast-1 has been in use for about eight months, according to a company spokesman. The

system can be installed on any machine with at least 65K of core memory. It currently runs on the IBM 360 and the Burroughs 5500 series.

Fast-1 reports or files are produced in three steps: establishment of an English file directory, completion of a simple run request form, and execution of Fast-1 computer programs.

The system is priced at \$4,500, which includes documentation and one year's maintenance, the company says. Each analysis program is \$250. The Fast-1 generator is priced at \$2,000.

Fast-1 may be leased for a period of 12 months, for 5% of total purchase price. Sixty percent of the lease payments can

be applied toward the purchase price, according to the company.

Training and installation will be billed on a time and material basis, plus travel expenses. Time and materials charges, to a maximum of \$300 are creditable toward conversion price on purchase.

Ancom Systems is located at 9841 Airport Blvd., Tenth Floor.

Address Label System Operates Under 360 DOS

UNION, N.J. — Macrodata Inc. has made available a generalized address label system (Gals) that operates under IBM/360 DOS and uses 2311 or 2314 disk, or tape master file.

The major system modules include maintenance, selection and printing. The package can be modified to purchaser specifications, according to the company.

Gals uses either fixed or free format cards for input, and the purchaser has the option to specify his own input card layout, which will be built into the system at no additional charge, according to the company.

System requirements are at least one disk and one tape, two disks, or two tapes. The programs are written in Cobol and Assembler Language, and require a 32K background partition.

Gals is available for a sale price of \$1,450, including an operating guide, source decks, keypunching instructions, and sample cards.

Macrodata Inc. is located at 1478 Morris Ave.

Tab Card Service Bureau Uses Optical Mark Reader

CHATSWORTH, Calif. — A tab card processing service bureau using an optical mark reader has been established in Los Angeles by the Electronic Systems division of Republic Corp.

The optical mark reader processes cards marked with ordinary no. 2 pencils, eliminating keypunching and making it possible for non-technical persons to prepare computer input data in plain language, according to the company.

The service uses Republic's Model 1501 optical mark reader that simultaneously reads both sides of pencil-marked 30-row, 80-column cards formatted to customer's specifications and containing up to 4800 data posi-

tions.

The Model 1501 reads up to 90,000 cards per hour, processing the information through a computer, recording the data on IBM-compatible magnetic tape and providing a print-out or other hard copy as required.

Tab cards for Fortran programming, school registration, and multiple choice formats are available now. Other formats can be designed and in use within four weeks, according to the company.

Processing cost is three cents per card including computer time.

Republic Electronic Systems division is located at 9754 Deerling Ave., here.

Closed-Circuit TV Speeds Training at Westinghouse

PITTSBURGH, Pa. — Closed-circuit television at the Westinghouse computer systems training center is giving an over-the-shoulder view of a single terminal keyboard to 16-20 trainees at a time.

The system is used in conjunction with more conventional classroom tools, including tape recorders, a blackboard, and a slide projector, to teach computer concepts, capabilities, procedures, and programming languages to trainees from both Westinghouse and its customer sites.

Mounted on a telescopic boom that can be moved from one end of the center to the other, the TV camera makes it possible to monitor the activity at any one of a variety of terminal keyboards located along one wall of the center.

The camera, with a high-resolution vidicon tube and standard 55-mm lens, is 10 in. long and 3

Education

in. in diameter. When in use, it is positioned just over the terminal operator's shoulder, giving each trainee a view of symbols and words as they are typed.

Eight TV monitors are mounted below the students' desk tops in the training center. When not in use, the monitors are tucked out of sight, providing additional space for books or other materials.

When the system is activated, latches at the front of each desk are released, and the monitors emerge automatically as the desk tops rise back.

Carl Lloyd, training manager for the manufacturing information services department of the Westinghouse Information Systems Laboratory (Wisl), claims, "It's got to have cut training time at least in half."

The nature of the program frequently requires training in both batch work and time-sharing, and "the system allows me in one week to get through both Fortran and Basic," Lloyd said.

"I can discuss while the things are happening live," he added, "and I don't have to have the lights out." This permits the simultaneous use of other classroom aids.



Call for Papers

1970 SEVENTH ANNUAL NATIONAL INFORMATION RETRIEVAL COLLOQUIUM, May 7-8, Philadelphia.

Titled "Social Impact of Information Retrieval System," the conference is sponsored by nearly a dozen local, regional, and national nonprofit organizations interested in information retrieval.

Feature sessions will focus on contemporary issues of the field, including the future of media as journals, books, proceedings, microforms, display consoles, and questions of information ownership, protection, and reliability and whether customers will pay for information.

The program will be arranged around presentations for which 500-word summaries of papers and short descriptions of other information exchange activities have been received by the end of January 1970.

Write Mr. Philip Bagley, president, Information Engineering, 3401 Market Street, Philadelphia, Pa., for complete details.



Instructor performs Teletype operations under watchful eye of closed-circuit television camera suspended on boom. Cable permits use of camera at various positions along classroom wall.

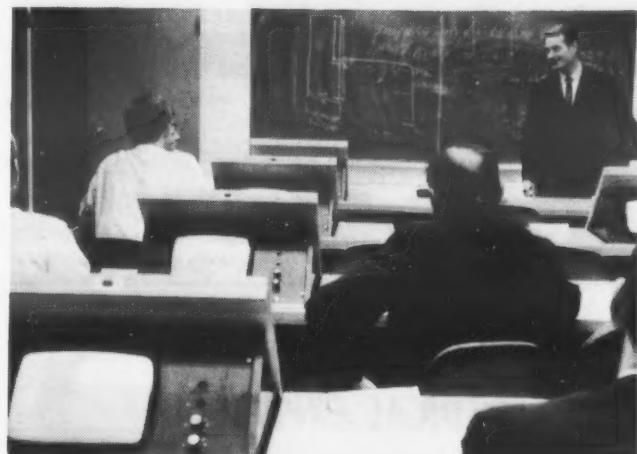


Image from Teletype demonstration projected on eight desk-top screens in classroom. Television approach permits clear view of instruction and simultaneous use of other teaching devices.

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Option I — to process an object deck through the disassembler creating a new source deck with page and line type labels.
Option II — to include label equates from an original assembly listing.
Option III — guarantees operational source deck.

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*CPU Management Advisory Corp. is a wholly owned subsidiary of Commercial Programming Unlimited, Inc., a publicly owned company.

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Peripheral Manufacturers Unite, Charter Association to Provide User Information

Societies

current markets and create new ones will also be considered.

The society is currently planning support programs and activities that will include:

Establishing a central information center to maintain up-to-date listings of available peripheral products.

Providing speakers for user gatherings.

Providing an organizational voice to government agencies regarding procurement programs.

Voicing the group's opinion on existing and proposed government legislation that may affect association members.

Establishing a standards review committee to study standards proposed by other associations.

government, or industry that would "promote the use of computer equipment by enhancing or sustaining the problems of equipment interchange and interfacing with computer systems."

Maintaining a liaison with other industry associations to acquire information for association members and the user community.

Promoting peripheral procurement programs with commercial end users.

Promoting a "peripheral expo."

Caveney said that the group hopes to increase its membership to over 100 within two years.

Both full and associate membership will be offered, with fees to be determined. The group plans to open headquarters in the Washington, D.C., area within three months.

IEEE Scheduling 1970 Guest Lecturers

PHILADELPHIA - The IEEE computer group's Distinguished Visitors Program has begun scheduling presentations for 1970, according to program chairman Dr. Noah S. Prywes at the University of Pennsylvania's school of electrical engineering.

Authorities from the fields of computer science and information processing are being selected to lecture and conduct infor-

mation discussion sessions at colleges and universities, organizations, and IEEE computer group chapters.

Also receiving consideration are movie and demonstration programs. Information about the availability of suitable presentations is now being solicited by the program chairman.

Funds have been set aside to meet the expenses of this year's

visiting lecturers, and priority will be given to requests of groups remote from metropolitan centers and unable to afford sponsoring a speaker on their own.

Organizations requesting speakers should contact Prywes at the University of Pennsylvania, Moore School of Electrical Engineering, 33rd and Walnut Streets, Philadelphia, Pa. 19104.

New Literature

Information Standards, Inc. has announced new brochures that describe the two services rendered by the New York-based EDP company. DataSystem is described as a business accounting service that integrates common commercial applications into a single system using a common data base. Infogen, the second service, is described as a series of programs to generate and maintain IBM operating systems at various user-desired levels.

An illustrated four-page brochure, GEA-9001A, describes how the Pittsburgh National Bank constructed a data file for its trust department using the GE integrated data store system (I-D-S). According to GE, the system makes it easy to consolidate, interrelate, process, and report business information. The pamphlet is available by writing GE Information Systems, Bldg. 6-207, Schenectady, N.Y. 12305.

A plastic wallet-size card containing a digital angle conversion chart is being offered by Astro-systems, Inc. The card compares N , 2^N bits, degrees per bit, minutes per bit, seconds per bit, and least significant bit as a percentage of full scale, for one to 25 bits in one-bit increments. A card may be obtained by writing the company at 6 Nevada Drive, Lake Success, N.Y. 11040.

Computer Guidance Corp. has

prepared a booklet containing a list of hundreds of data processing acronyms and abbreviations. Requests should be submitted

on letterhead and sent to Mr. J.P. Tutunjian, Computer Guidance Corp., 777 Third Ave., New York, N.Y. 10017.

smtwtf calendar

Dec. 17, 18, Hartford, Conn. - Two Seminars, "Project Control Systems" and "Documentation Standards." Contact: Matthew R. Smith, Brandon Systems Institute, Inc., 1700 Broadway, New York, N.Y. 10019.

Dec. 17-19, New York - A seminar, "Computer Operations Management and Control." Contact: Matthew R. Smith, Brandon Systems Institute, Inc., 1700 Broadway, New York, N.Y. 10019.

Dec. 18-20, Miami Beach, Fla. - The Third International Symposium on Computer and Information Sciences, which is cosponsored by the department of engineering at the University of Florida and the Department of the Army Research Office, will have the theme "Software Engineering." Contact: Mrs. Grace Searle, department of electrical engineering, University of Florida, Gainesville, Fla. 32601.

Jan. 19-21, New York - Compso East, a regional computer software and peripherals show, scheduled for the New York Hilton. Contact: Show World, Inc., 37 W. 39th St., New York, N.Y.

Jan. 29-30, Costa Mesa, Calif. - A symposium concerned with computers in education, at Orange Coast College, sponsored by the California Educational Computing Consortium. Contact: Don Jacobs, Orange Coast College News Bureau, 2701 Fairview Road, Costa Mesa, Calif.

Feb. 13, Atlanta - A seminar, "Telecommunications and the Computer," at the Regency Hyatt House, sponsored by the Association for Systems Management, Atlanta Chapter. Contact: Mr. C.L. McCune, 3005 Cherry Blossom Lane, East Point, Ga. 30344.

Feb. 17-19, Chicago - Compso Midwest, a regional computer software and peripherals show, scheduled for the Pick-Congress Hotel. Contact: Show World, Inc., 37 W. 39th St., N.Y., N.Y.

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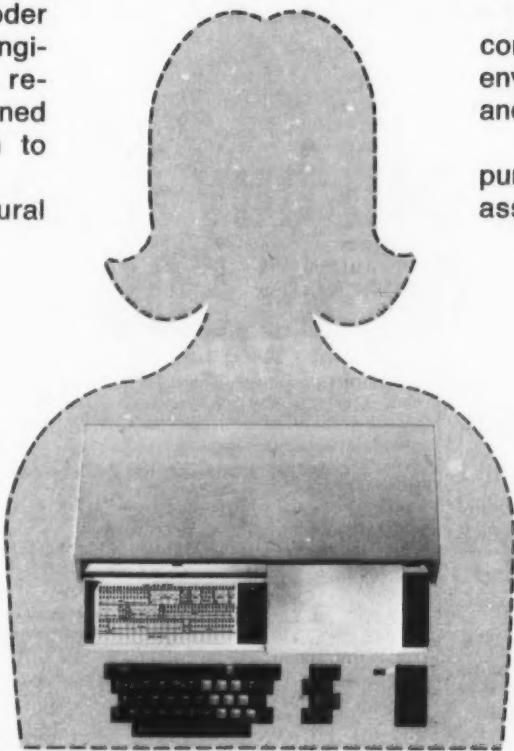
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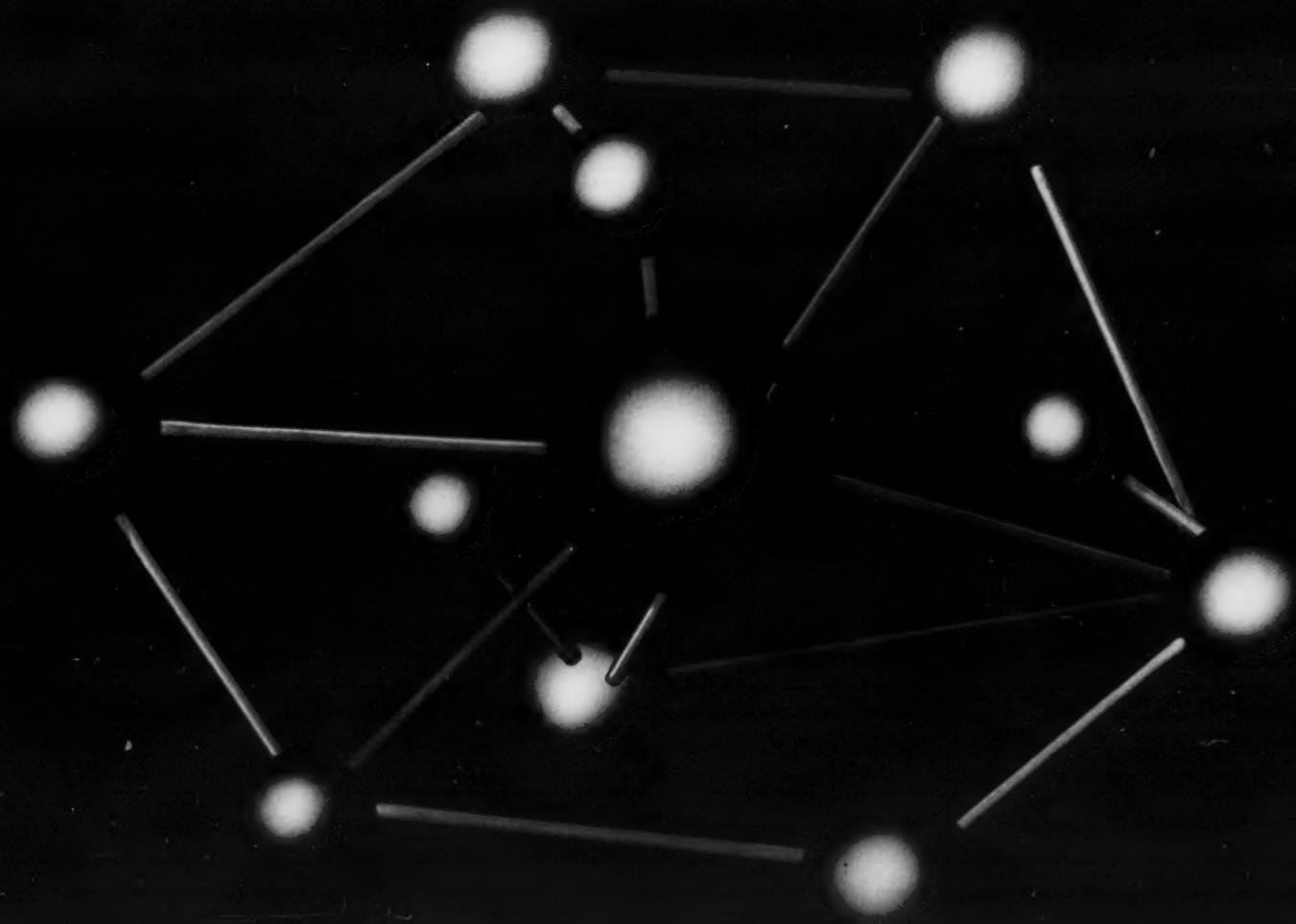
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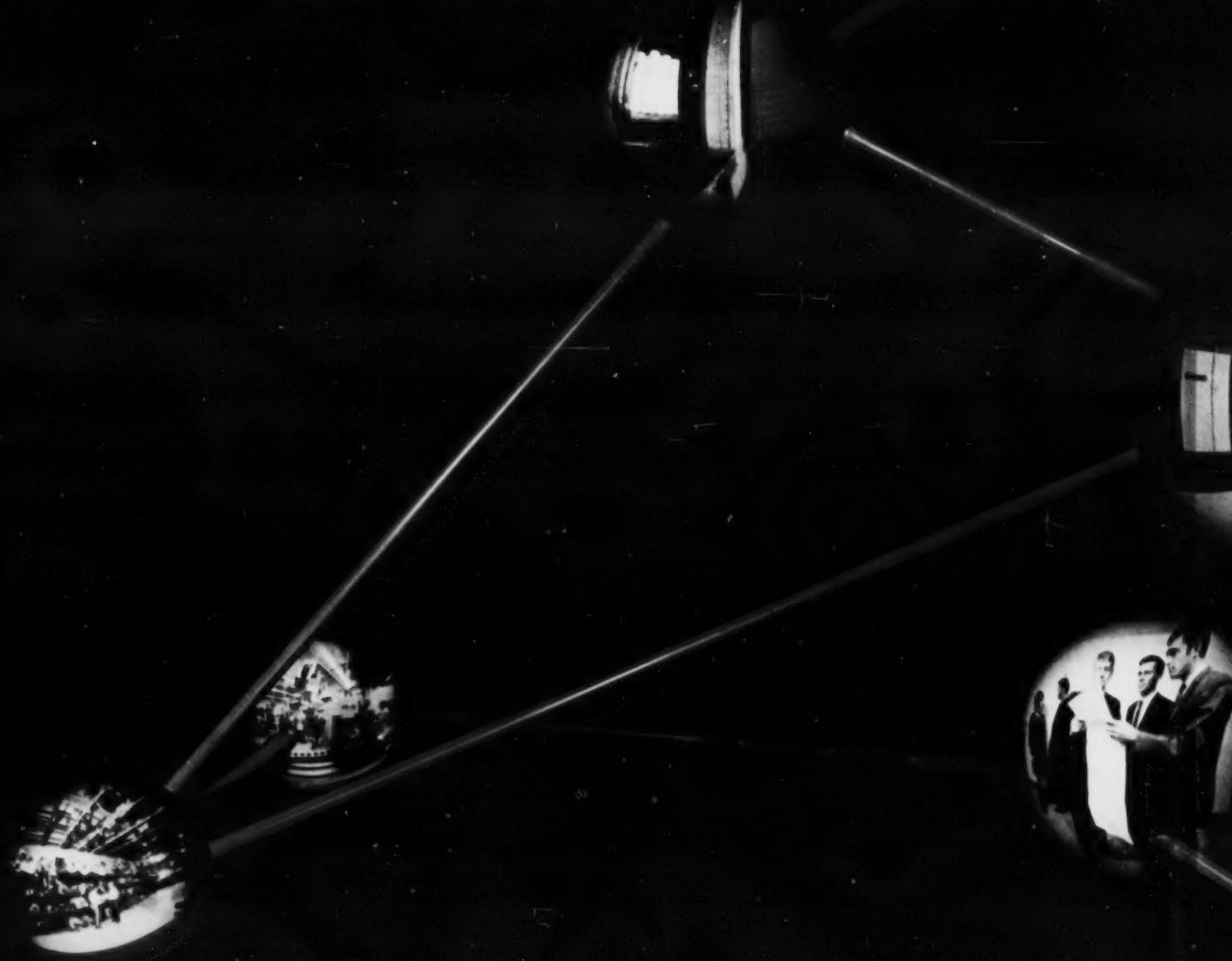
General Electric announces the United Systems



GE United Systems are the only systems that can truly unite your computers ...unite your people ...unite your business

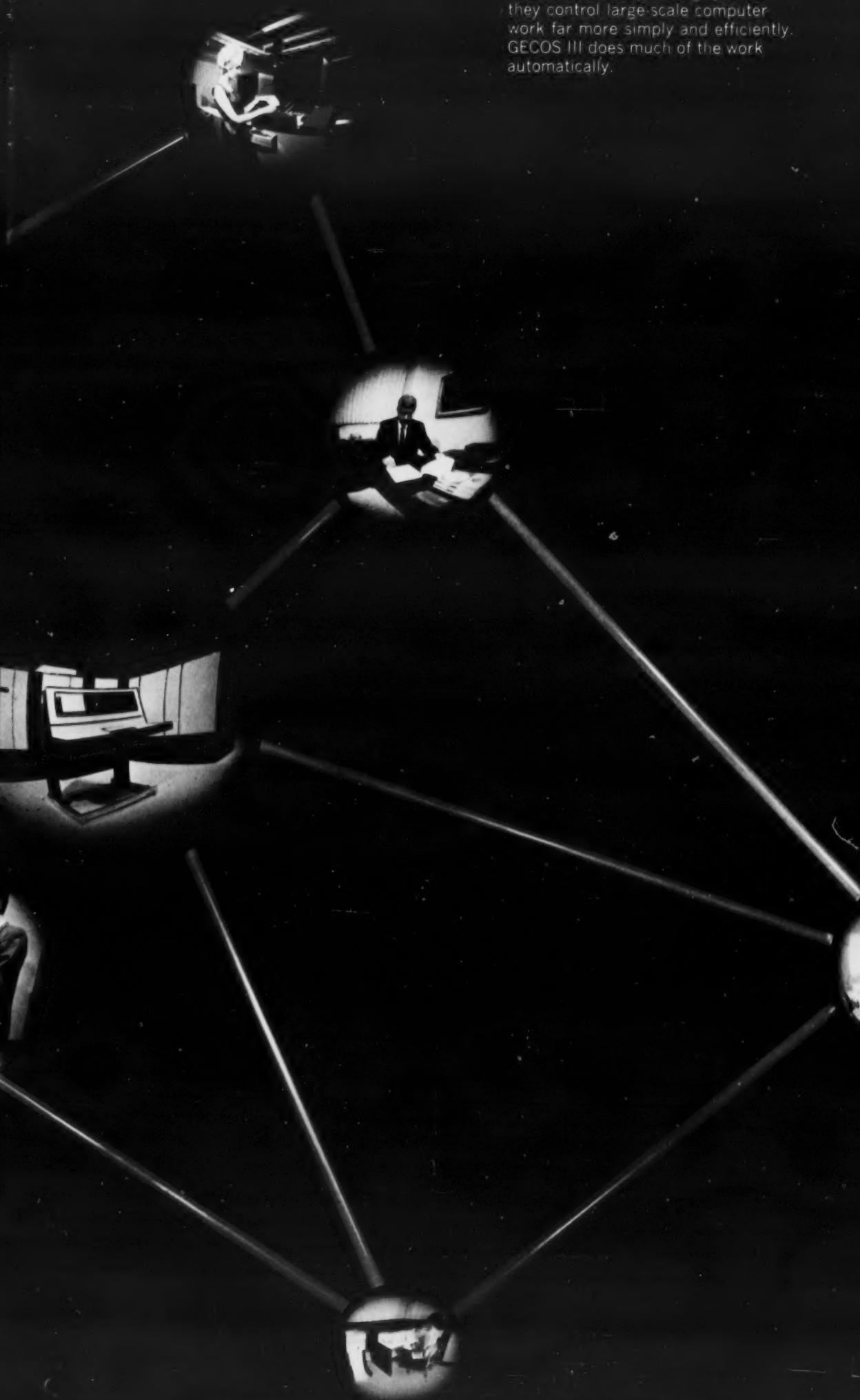
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Or write for our new GE-655 United Systems brochure to Section 290-67, General Electric Company, 1 River Road, Schenectady, New York 12305.

GENERAL  ELECTRIC

Ghost of Northwest Computing Association Dissolved

By Robert L. Glass

Special to Computerworld

SEATTLE — The disappearance of the Northwest Computing Association (NCA) in 1966 bore all the earmarks of an Ellery Queen novel. On Dec. 13 of that year, a full meeting of the chapter was held, but shortly thereafter, for no immediately identifiable reason, the organizational machinery ground to a halt.

As organizations go, this phenomenon is not unusual. The NCA case, however, was distinguished by two facts: the membership was never notified of the group's demise, and the treasury of \$1,629.30 was left behind.

The society, in apparent good health, had suffered a setback and, following a brief illness, died. The mystery has only recently been unraveled.

In its time, the NCA was one of the leading professional organizations of its type in the country. It was formed in the mid-1950s by a nucleus of Boeing Aerospace computing personnel anxious to exchange computing knowledge and bridge the geographic gap that sometimes isolates the Pacific Northwest from developments in the rest of the country. The group grew rapidly and attracted a diverse membership.

They held monthly meetings, featured prominent speakers, and hosted nine annual conferences for their membership. Annual dues of \$5 gave the organization a substantial bank account, and its members voted to establish scholarship funds for computing students at two Seattle universities.

A Formidable Rival

The beginning of the end was heralded by the formation of a Seattle-based chapter of the Association for Computing Machinery (ACM). The NCA considered and then rejected a proposal to merge with that chapter, perhaps favoring NCA's lower dues and broader, less academic appeal.

Nevertheless, the ACM chapter continued to grow, as did the competition for organizational leaders, and some key NCA members switched to the ACM camp.

Then in March, a concerned member wrote to the organization asking for an explanation or a refund of his dues, and received no answer.

Gus Deckert, an IBM representative serving as NCA president in 1966, recalls what happened. "Some of the officers had never been members before," he said, and "some of the officers of the previous year had dropped out in mid-term." He tried, without success, he said, to get reports from them and to encourage attendance at meetings. So the body was aban-

doned, becoming only a legal skeleton.

Recently an attempt was made to resurrect the body's board of directors — no small task after three years.

The membership had drifted widely and only six of the invited 13 members attended the meeting, which turned up a few more surprises.

The most recent NCA treasurer, Bruce Walker of Seattle-First National Bank, disclosed that he had recently learned of the existence of a second NCA bank

account containing \$99.65. It is said to be the remains of the group's account for its annual computing conference.

Second, the NCA post office box in Seahurst, Wash., was closed some time ago with no forwarding address.

Finally, the \$1,629 treasury had been in a checking account for three years, so that close to \$250 in potential interest had been forfeited. A motion to move the funds to a savings account had been passed by the NCA board at one time, but the

action was never carried out.

It was quickly decided that, barring other complications, the group would be officially dissolved.

Leaving a Will

Disposition of the treasury took a little longer, but was settled on the basis of the 1966 decision to provide scholarship funds for computing students. The letter accompanying the awards had promised the schools that more assistance would follow, so there was little doubt

that the dispersal of funds in this manner had the approval of the original membership.

Half of the money will be given to the University of Washington and half to Seattle University. It will go to outstanding students whose long-range goals include graduate work in the computer sciences. Scholarships will be granted at the rate of \$100 per quarter.

So the NCA, dead for three years, has finally been laid to rest, having left a handsome bequest.



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Florida Parking Violators Face Arrest, Fine for Non-Payment of Punched Tickets

FORT LAUDERDALE, Fla. — Parking violators will no longer be able to avoid paying their fines, according to a spokesman for the city's data processing center.

A new computer system has been devised which will keep the city, and the municipal court, up to date on the payment of parking tickets. The result for the violator will be a warrant for his arrest if the fine remains unpaid after eight days.

For the city it will mean more than double the normal revenue for such fines.

Video Data Terminals

About 12 police stations in the city have been equipped with

video data terminals. Each individual station is linked by telephone wire with an RCA Spectra 70-45, located in the city's data processing center.

New style parking tickets have been devised to accommodate the system. The new ticket is a three-part, prenumbered IBM card with suitable spaces for relevant information. When a meter maid issues a citation, one copy goes to the car owner, one to the court and one to the data processing center.

When the owner of a car is ticketed for a violation he sends his ticket with the \$1 fine to the data processing office. The card is then canceled and transferred from an active tape to a memory

tape for future reference.

If the fine remains unpaid after three days, the computer rejects its copy of the citation, and types a warning letter to the owner.

Within another five days, if the fine still remains unpaid, the computer prints out a warrant for his arrest.

In such cases the police call at the offender's house and take him into custody. There he is fingerprinted and booked, and must post bond before being released.

In addition to the fine, drivers will also face the possibility of having their licenses withheld for failure to pay.



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applications

California Campers Aided By Store Based Terminals

SACRAMENTO, Calif. — California campers will soon be able to plan their holidays with the aid of a computer, according to the State Department of Parks and Recreation.

The state has contracted with Computicket Corp. of California to provide a network of computer terminals in key metropolitan areas in the northern and southern parts of the state, according

to a spokesman for the department.

Prospective campers will use the new service to find out immediately whether any camp-sites are available. The computer also provides instant confirmation and reservations to 87 camping areas in the state. There is a \$1 charge for the service.

Consoles Linked to L.A.

More than 50 Computicket consoles have been installed in various stores, supermarkets, and banks throughout the state.

These are linked by telephone wire to two IBM 360/40s located in Los Angeles. The consoles are operated by the staffs of the business establishments where they are located.

To utilize the service, a camper goes to his local computer reservation outlet and indicates the park, the dates desired, and the size and type of his equipment.

The operator wires in this information to the central computer. Seconds later, a message appears on the screen indicating that the desired space and dates are available.

If sites are not available, the computer offers an alternative. A number of alternatives can be requested if necessary until a suitable location and date appears.

At this point the camper pays the full fees due along with the \$1 service charge.

The reservation is then confirmed and the terminal produces a ticket showing the name of the park, date of the first night, the number of nights, site size, and the camper's name.

An information sheet advising the buyer about cancellations, refunds, and similar matters is produced along with the ticket.

By accepting mail applications, the department will allow all campers in all areas an equal opportunity to take advantage of the computer's services.

These applications will list three alternatives, and will be fed into the terminal installed at the Parks and Recreation headquarters in Sacramento.

The application for mail reservations will be available in mid-December. However, they will not be accepted unless postmarked after January 1, 1970, when the system is expected to go into operation.

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By time-sharing the data from 60 or more keyboard operators simultaneously, significant savings in data station costs of as much as 50% can be achieved. Costs drop to as low as \$4300 per data station for a typical 60 station system. For large data preparation installations, the time-shared input is the only economical way to go.

Data entered into the LC-720 is processed by a small digital computer and stored on an IBM/

360-compatible magnetic disc that provides the advantages of bulk storage and high speed random access of data. The problems associated with punched card handling or the mounting, pooling, merging and unmounting of magnetic tape reels are eliminated. All data is conveniently and economically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM/360-compatible magnetic tape is also provided with the system as standard equipment.

The LC-720 KeyDisc System also offers for the first time, data verification requiring one input pass only through the system, in addition to the normal technique of verification requiring two different operators. Record size is infinitely variable by each operator from 1 to 120 characters long and the system stores a large library of 30 or more different format control programs, all available simultaneously to any and all operators.

LC-720 KeyDisc System

Bring your own data for a demonstration

Logic Corporation invites you to see an operating demonstration of the LC-720 KeyDisc System at the company's premises. Bring your own original data and Logic will provide a reel of magnetic tape of the output of your data from the LC-720 for later printout at your own computer facility.

To arrange for a demonstration, contact Gary Tischler, Director of Marketing (201) 334-3713

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Epilepsy, Brain Damage Diagnosed By Computer

PALO ALTO, Calif. — A 35-lb mini-computer can produce diagnostic reports of electroencephalographic (EEG) tests for epilepsy, tumor location, and other brain damage faster and more uniformly than a neurologist, according to Dr. Stephen Sherwood, a neurologist at the Veterans Administration Hospital here, who developed the new system.

"At present a neurologist must spend 15 to 20 minutes dictating his analysis and conclusions of EEG recording charts, which themselves can measure 100 ft to half a mile in length," Sherwood explained.

"After 10 to 15 patients per day, the neurologist tires and his judgment and accuracy can be dulled.

"The mini-computer prepares

Computerized Voting Makes Ballot Slips Obsolete in Bonn Parliament

BONN, Germany — The German parliament, the Bundestag, is installing a system that will enable federal legislators to vote on bills by computer.

When Social Democrat leader Willy Brandt was elected chancellor in October, old fashioned ballot slips were used.

With the new system each deputy's desk will be equipped with a row of buttons. He can vote yes or no, register an abstention, or indicate that he wants to speak or put a question to the speaker.

Each deputy will have a special code in the computer to identify him on votes. However, the computer can also conceal identities when a secret vote is necessary.

A shield will cover the row of buttons to prevent a deputy from spying on his neighbor.

To prevent one deputy from pressing another's button, the system will operate only when a deputy is sitting at his own desk.

Because it will deliver accurate figures the computer will make it harder for the president of the House to ignore absenteers.

Previously, at late night session, the president has turned a blind eye to the theoretical need

Basketball 76'ers Use Computerized Scouting

PHILADELPHIA — The Philadelphia 76'ers and Comserv have combined to design a computerized basketball scouting system.

Jack Ramsay, 76'ers general manager-coach, and Jim McMonagle, manager of marketing research for Comserv, conceived the idea for the purpose of giving the Philadelphia professional basketball team a modern, objective method of evaluating potential pro players.

The system will rate the players in a variety of categories such as shooting ability, defense, ball-handling, and speed. The computer will be fed this information and produce a composite evaluation that will enable the 76'ers to rank the available college players and draft according to the team's needs.

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the diagnostic report in less than two minutes and draws conclusions without obviously ever experiencing fatigue or boredom.

"And this is only the first phase of applying mini-computers to EEG diagnosis," Sherwood explained.

Applications

"The next step is to eliminate the charts entirely by using magnetic tape to record the slow, 3-30 cycle per second brain waves and playing it back at high speed for the computer to scrupu-

lize the characteristics of each wave and diagnose the patient's condition by itself," he said.

The computer is a Varian 620/i general purpose digital computer which has a memory of 4,096 words of 16-bit characters. The software program for the EEG diagnostic reports was prepared by Sherwood, a member of the American Society of Cybernetics and numerous international EEG societies, in conjunction with Donald Wilson of the Stanford University medical computer center.

With Sherwood's system, the neurologist or technician prepares a diagnostic report merely by typing a group of four letter mnemonics on a Teletype keyboard.

Descriptive of the patient dur-

ing the electroencephalographic recordings and of the transcriptions on the chart, these input code words read, for example, "DRUG," meaning a patient with drug dependence; "NAPN," patient in light sleep; "AGTS," age 12 to 60; and other clinical observations such as "OCCI" "WSWT" signifying occipital spikes and waves atypical.

Thus, a complete encapsulated code covering every pertinent aspect of the patient and his brain wave patterns will consist only of 40-50 four-letter inputs.

The 620/i computer processes these code words into a clinical report and draws a diagnostic conclusion, e.g., 'normal' or 'clearly abnormal' and the localized source of the brain wave anomaly if it is focal.

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Exhaustive Studies Help Fight Water Pollution on Miami River

DAYTON, Ohio — An important breakthrough in the fight against water pollution has been made by engineers of the Miami Conservancy District.

They are making one of the most detailed and exhaustive studies ever made on a river with the aid of a computer.

By determining the factors that influence water quality on this heavily used river, officials hope to develop practical means for improving and maintaining high quality levels.

To accomplish this, massive amounts of information are being collected from the river throughout the district. From this data, a mathematical model of the river is being created on the conservancy district's computer.

By using the data given to the computer, the effect of varying conditions, either real or projected, can be simulated reliably.

Interaction of Pollutants

Quality conditions on the Great Miami River are the result of a complex interaction of the discharge of treated municipal and industrial waste waters, runoff from urban and agricultural areas, and the physical characteristics of the river itself.

These factors are complicated by the great concentration of cities and industries for 130 miles along the banks of the river from Sidney on the north to the Ohio River on the south.

The close proximity of these main sources of waste load make it difficult to develop a realistic and effective program for water quality protection unless their combined effects can be studied.

The cost of the program is distributed among 20 municipal and county treatment plants, 15 paper mills, 20 other industries, five power plants and five counties, all of which hold permits from the Ohio Water Pollution Board to discharge their treated water waste into the river.

Their obligation to the cost of the study is primarily based on the quantity of discharge to the river.

Volume of Information

"The biggest problem of a project like this," explains Max Mitchell, chief engineer of the Miami Conservancy District, "is the massive volume of information that must be collected and processed."

Water quality study, he explains, is very different from other hydrology projects.

Water conditions, highly affected by light and temperature, as well as the loads being introduced from factories, community treatment plants and similar sources, change from minute to minute, and from one part of the river to another.

"Obviously," Mitchell explains, "the volume of data, calculation and manipulation involved here is such that a computer was a basic working requirement for our study."

Mathematical Model

To stress this point, Mitchell indicates that use of a mathe-

matical model calls for making literally millions of numeric representations available for computer processing on a random basis.

Under the district's current program, this mass of information is stored in process-ready format on a two-spindle disk file which is part of the organization's NCR Century 100 computer system. Two easily interchangeable disk packs mounted on this file unit contain up to 8.4 million characters of data.

"This gives us enough capacity to house large segments of a mathematical model within the computer system at any time," Mitchell explains.

"Then, as our work requires, we can change disks to apply our programs and test data up and down the whole length of our numerically represented stream."

Monthly Report

The system set up for regular monitoring of water quality in the Miami basin calls for a continuing flow of information into and from the district's computer.

For example, each of the 60 users of the river must make a regular monthly report on stream loading to the Ohio Water Pollution Board.

Copies are sent to the Miami Conservancy District, where the data on the reports are key-punched and entered into the computer.

This is no small task, because there is no standard form used for these reports as each user is discharging in the stream effluents of different character.

One of the earliest jobs of the computer programmers at the Conservancy District was to devise a program that could translate these varying reports into a format usable with the pollution report programs.

The cards that are punched from these forms give the quality of the influent to the plant and the effluent into the river.

The combined reports from the computer show what each plant is doing, and gives the total volume of loading for any given stretch of stream. All of this data goes onto the Century's disk files, as does the detailed information from other reports.

Sampling Teams

Among these are reports made by the Conservancy District's own sampling teams that take routine samplings from various locations on the stream, measuring such conditions as the flow, air and water temperature, weather conditions, pH and dissolved oxygen content.

Laboratory reports from these samplings will also list the amount of various compounds: nitrates, phosphates, and metals such as iron, lead, copper, zinc, chromium, cadmium, arsenic, phenol or cyanide.

Other reports will measure the chlorides, sulfates, dissolved and suspended solids, and the chloroform content.

A kinetic survey of the stream has been completed. This gener-

ates much new information pertaining to measurement of the river's ability to assimilate waste loads. In still another study technique, trailers have been outfitted with monitors to continuously record various parameters of the water quality.

At this time, the Century's sole purpose is the processing of engineering data, primarily for the water quality project.

Before the beginning of this project, many computer programs had been established for the flood control using the data center at the University of Dayton and various other facilities in the area.

Every engineer at the Miami Conservancy District must be his own computer operator.

"As we operate today," Douglas Whitaker, the conservancy's data processing manager says, "the man who needs the information is standing right there, when the computer prints it out. For the most part, these printouts are statistical reports on flow or pollution conditions."

"Should the engineer want to hypothesize — to test other influent or effluent rates, for example — he can enter cards which simulate the conditions he wants to observe. The computer will deliver the data he needs in seconds."

Further, Chief Engineer Mitchell explains, results can be measured graphically on a dioramic scale model of the Miami River which has been constructed in the district's offices.

This model has built-in data displays to indicate flow and pollution factors over the whole length of the stream.

Mitchell goes on to explain that this type of engineering computation support has been the sole responsibility of the Century 100 system up to this writing.

However, he adds, the studies are already under way which will lead to increased value-justification through use of the same computer for administrative and accounting operations within the district.

But, according to Mitchell, the main focus for computer operations will always be in supporting engineers.

Effects of Pollution

"In developing our water-quality management program," says Mitchell, "one of the big problems is to know just what effects pollution really has on the river."

"Only with these computer capabilities will we be able to get answers. The nature of the stream itself is very important, for a condition that may affect the Miami River adversely could have very little effect on some other river."

"For this reason the work of our ecologists is also very important; data provided by the computer helps them evaluate the work that has already been done on the river, and project the effect of future projects."

"They are learning the effect of conditions on native aquatic life, the reactions to variations in water temperature, water levels, and similar factors."

•WHY WE STOCK PARTS FOR A VANISHING BUSINESS.

The unit record business is in such a state that it produces only about \$500,000,000 in annual revenues in this country. Maybe only \$600,000,000.

If that seems like a lot of money for a vanishing business, consider the fact that there are an estimated 600,000 punched card machines now in use at more than 40,000 installations.

A lot of equipment for a vanishing business. And it takes a lot to maintain our share of it. That's why we stock 16,000 parts, why we reconditioned over 3,000 machines during the past fiscal year, and that's why we

have a customer service force of almost 1,000 men and more than 50 service offices.

Some-times we wonder what it would be like in a business that



wasn't vanishing. But after all this time we're used to it. People started waving handkerchiefs at the unit record business fifteen years ago when IBM brought out the 650. Then it was the 705. Now it's System/3 and we're getting the senior citizen treatment again.

Not that the unit record business hasn't changed. But changed is not gone. Punched card consumption keeps going up every

year. Walk into just about any office and you'll find some familiar tabs and sorters and verifiers still churning away. Still doing the same jobs. Or doing new jobs, such as low-cost computer editing and back-up. Much as the IBM 1401 (remember when that vanished?) is now being used in support of more sophisticated computers.

And if you think the only people left in the unit record business are the brokers, you are invited to contact one of our sales representatives. He will assess your data processing needs and recommend the right machines for you. You can buy them outright, or you can rent them short or long term. Or both. However you choose to do it, you will probably end up saving money.

The new computers, those high-priced stars, are getting a very noisy reception. Which is as it should be.

But if you listen closely, beneath all the commotion you can hear the familiar sound of the punched card machines. Humming away, getting the work out. And, of course, needing attention. That's why we stock all those parts. They're very important in a vanishing business.



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Loading Data, Operations, Navigation Automated Aboard Japanese Tanker

NEW YORK — An advanced computer system, capable of reducing crew size by 50%, is being installed aboard a 138,370-DWT oil tanker being built in Japan.

The heart of the system is the Tosbac 3000 computer, developed by Tokyo Shibaura Electric Co., Ltd. (Toshiba).

With keel laying scheduled for Dec. 1969, and delivery in Sept. 1970, the ship will reportedly be Japan's most highly automated

vessel, according to the builder, Ishikawajima-Harima Heavy Industries Co., Ltd. (IHI).

A Toshiba spokesman in the U.S. disclosed the main functions of the computer:

□ Operational Functions — Automatic control of crude oil loading and discharge, and monitoring operation of the main engine performed.

□ Navigational Safety — Courses of nearby vessels are plotted; the system automatically sounds alarm if potential collision course exists.

□ Loading Data — Displacement, tank capacities, and optimum loading plan calculated.

□ Loading Data — Displacement, tank capacities, and optimum loading plan calculated.

The Toshiba spokesman pointed out that development and construction of this advanced computer system cost approximately \$1.1 million. During the first year of operation, the system will be subjected to vigorous testing, while the vessel is placed in service hauling crude oil to Japan from Sumatra or the Persian Gulf area. Adequate measures and systems are to be incorporated in the computer systems to provide for manual override in the event of any malfunction.

In addition to Toshiba and IHI, other participants in this project are: the shipowner, Sanko Steamship Co., Ltd.; Japan's Ministry of Transportation; the Japan Shipbuilding Research Association and the Japan Marine Equipment Department.

Goldfish Studied To Find Internal Guidance System

COLLEGE STATION, Texas

— Various species of fish may have a built-in internal guidance system, according to Dr. Herman Kleerekoper at the Institute of Life and Science, Texas A & M University. The discovery could help unravel many of the mysteries associated with animal navigation.

Using a small computer, the PDP-8/S manufactured by Digital Equipment Corp., Kleerekoper's group tested common household goldfish. "We were able to determine that these fish are capable of compensating left- and right-hand turns, and maintaining an approximately straight course of progression," Kleerekoper said. "The goldfish maintained this capability at a high level of efficiency without directional cues from their environment. Hence, this raises the possibility of an internal guidance system."

The test was set up with the fish contained in a tank 16 ft by 16 ft. Their movements were monitored by a series of illuminated photo-conductor cells, which were interfaced to the PDP-8/S computer.

When the goldfish shaded one of the nearly 2,000 rays of light generated by the photoconductor cells, an electrical input was sent to the computer, which noted the location of the cell in question.

The PDP-8/S monitored frequency and angles of turns, sequential relationships, and the lengths of intervening straight movements. The data was output to a Teletype, a CRT display, a plotter for analysis, or a magnetic tape storage unit for additional processing.

The computer was also used to calculate the values of the velocity of locomotion and the orientation of the goldfish to their environment.

Don't lose your head over a little historical trivia. We'll give you a big hint: She lost hers. Not good enough? Henry VIII's second wife? Not yet? The hexadactyl was Anne Boleyn, of course. But it's not trivia we want to expand your mind with. It's a simple fact: Vermont Research is the memory company. We're the company that

What English queen
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expands the capabilities of your computer with the best drum and disk memories available. And we're the company that has just expanded our own capabilities.

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DRUM AND DISK MEMORIES - CONTROLLERS

COMPUTERWORLD

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John Bull Looks for U.S. Business: ICL to Install 1902A in New York

NEW YORK — The British are coming!

International Computers Ltd., the United Kingdom's counterpart of IBM, has announced the first order for installation of a British computer in the U.S.

This order, however, does not indicate a new British assault on the American market. Rather it is the first of a small number of installations to be made in New York to aid ICL in selling British computers to American corporations for use overseas.

Barclays Bank DCO, whose British parent company is one of the largest banks in the world, has ordered an ICL 1902A, as well as a magnetic tape file, line printer, card reader, magnetic ink character reader/sorter, and punching equipment. Backup support for the installation will be through ICL's New York office and from International Computers of Canada, Ltd., based in Toronto.

ICL plans to have about four such show-piece installations in New York. Though this is their first CPU sale here, their peripheral equipment has already made its bow. They hope that their system will demonstrate British ability "under the very exacting disciplines of banking requirements in New York."

A typical 1902A installation rents for \$6,000 to \$8,000 per month.

Early Data Indicate 263% Increase In Dearborn Sales

NEW YORK — Dearborn Computer and Marine Corp., the computer leasing company that decided to diversify into offshore oil drilling and pipeline construction, has reported preliminary year-end results indicating a 263% leap in sales and a 117% gain in income.

Speaking to a group of securities analysts in New York, company president Arthur Weiss said that the unaudited figures show revenues of \$38,473,000 as opposed to \$10,613,000 in 1968, and net income of \$2,715,000 against \$1,250,000 for the year earlier. This boils down to \$2.10 per share preliminary or \$1.95 per share on a fully diluted basis, while the 1968 per share earnings were \$1.50.

Dearborn Computer and Marine was originally a computer leasing corporation, but began to diversify in July, 1968 with the acquisition of the Storm Drilling and Storm Marine Drilling companies. In March of this year they purchased Curran and Co.,

a pipeline construction firm, and they have also acquired exploration rights and options on over 60,000 sq mi of on- and offshore Indonesian oil land.

Hurricane Camille disrupted Curran's operations, and that segment reported a third quarter loss of \$470,000. However the computer leasing section of the company's business has begun to bear fruit.

Third quarter revenues for computer leasing were \$11,095,000 against \$3.7 million for 1968. Dearborn's policy, though, is to concentrate on the new acquisitions, and they have leased no new computers in 1969.

Dearborn is currently seeking partners to develop their Indonesian oil fields.

The firm is also involved in the marine services industry through their purchase of Muchowich Marine Service, Inc. Dearborn now has a total of eight drilling rigs operating.

Unaudited Year-End Figures Say Recognition to Make \$4 Million

BOSTON, Mass. — Recognition Equipment President Herman L. Philipson has announced that preliminary year-end figures for his company show a net profit in excess of \$4 million as compared to a net loss of \$2.1 million in fiscal 1968.

Speaking to the Boston Security Analysts Society, Philipson stated that in fiscal 1969 Recognition Equipment delivered goods with a purchase value of \$40 million, compared to \$27.3 million in fiscal 1968. Revenues for the year were about \$36 million.

These 1969 preliminary results represent a contribution to earnings per share of about 80 cents, compared to a loss per share of 44 cents in fiscal 1968.

The 1969 figures are not consolidated to include Docutel Corp., a 57%-owned subsidiary. Docutel has two product lines: the Docuteller currency dispenser and the telecar baggage system.

The first currency dispenser installation was made during the year, and the current backlog is \$2.1 million, representing orders for 154 currency dispensers and related encoding devices.

The prototype telecar baggage system was completed recently and an aggressive marketing program with the major airlines and airports is being conducted.

Docutel has reported an estimated net loss of \$777,000 as expected.

"During 1969 there was a substantial increase in the size of our marketing organization," Philipson commented. "Our experienced marketing professionals spent a good part of fiscal 1969 recruiting and training new men who only began to be effective during the latter part of the year."

He said that about two-thirds of all fiscal 1969 orders were booked during the last quarter of the year, and the year-end backlog of signed contracts and letters of intent was \$33 million.

"As a result," Philipson told the society, "we have chosen to plan, for now, only a modest

increase over fiscal 1969 for our 1970 shipment level. As in prior years, shipments during the second half of the year will be at least double those in the first half.

"We do, however, expect to show a very substantial increase over 1969 in net income for fiscal 1970," he said, "followed by a major increase in shipments, revenues, and net income for fiscal 1971."

Philipson also stated that Recognition was increasing its R&D efforts and expected that at least 25% of fiscal 1971 shipments to be new products announced during 1970.

Estimated Figures Show \$1 Million Loss by Corp. S

BOSTON, Mass. — Corporation S, Dallas, has reported an estimated net loss for fiscal year 1969, ended Oct. 31, of about \$1.1 million, as compared to a net loss of \$382,546 for fiscal 1968.

Merle J. Volding, acting chief executive officer of the optical character recognition services company, announced the estimated results recently at a meeting of the Boston Security Analysts Society.

Volding said that during fiscal 1969, the company established 13 Optimization (optical input

automation) Centers, one of these having two OCR systems. Corporation S formed joint-venture corporations with leading banks for nine Optimization Centers in the U.S. and Europe. Four Optimization Centers are wholly owned by Corporation S.

"Our plans for fiscal 1970," Volding said, "call for continued expansion of the Optimization Center network in the U.S. and abroad. All of the Optimization Centers established last year should begin to operate profitably during fiscal 1970," he added.

Systems Engineering Labs Takes Partner

FORT LAUDERDALE, Fla. — Systems Engineering Laboratories, Inc., and Spectral Dynamics Corp. of San Diego have reached an agreement in principle under which Systems will offer to exchange 5/8ths of a share of its common stock for each share of Spectral Dynamics common stock.

The agreement is subject to approval of the boards of directors of both companies and by the shareholders of Spectral Dynamics at a meeting to be called in the near future.

Systems, based in Fort Lauderdale, is a manufacturer of digital computers and systems utilizing them. Systems markets its com-

puters, systems, and other products through direct sales and service locations throughout the U.S. and Canada.

Revenues for the fiscal year ending June 27, 1969, were \$17,298,000 and profits were \$1,453,000 which amounted to 70 cents a share.

Systems recently reported 12 week revenues for the period ending Sept. 19 of \$4,250,000 and profits of \$284,000 or 14 cents a share.

Spectral Dynamics, based in San Diego, Calif., is a designer and manufacturer of electronic instruments used in vibration and acoustic analysis, data acquisition and structural design and of custom systems using these instruments. Spectral's products are marketed in the U.S. and abroad through sales representatives.

Revenues for the fiscal year ending March 31, 1969, were \$3,452,000 and profits were \$217,000 which amounted to 54 cents a share. Spectral recently reported for the six months ending Sept. 30 revenues of \$2,237,000 and profits of \$163,000 or 39 cents a share.

Spectral Dynamics will be operated as a subsidiary continuing with its product line and its own sales organization.

HF Image Systems Paves Way for Merger

CULVER CITY, Calif. — Shareholders of HF Image Systems, Inc., at their annual meeting Nov. 25 approved the merger of the company into a newly formed, wholly owned subsidiary called Image Systems, Inc.

Under terms of the merger, each outstanding share of common stock of HF Image Systems, Inc., will automatically and without surrender and exchange of certificates be converted into one share of Image Systems common stock. The 1.4 million shares of HF Image Systems common stock held by its parent company, Houston Fearless Corp., will be converted into 100,000 shares of common stock and 1.3 million shares of Series B common stock of Image Systems, Inc.

Designed primarily for finan-

cing purposes, the merger also will facilitate the proposed merger of Image Systems and Houston Fearless Corp., which owns 80% of Image Systems. In September, HF Image Systems and Houston Fearless announced they had agreed in principle to merge into a single new corporation to be called Image Systems, Inc.

The proposed merger of Houston Fearless into Image Systems, Inc., is subject to approval by shareholders of both corporations within the near future.

The new corporation, Image Systems, Inc., will continue to concentrate its activities in the micrographic field in which HF Image Systems has been engaged. The company produces a microfilm storage and retrieval system known as Card (compact

automatic retrieval display).

HF Image Systems President Donald E. Chelew reported to shareholders that for the nine months ended Sept. 30, costs exceeded sales revenues of \$2,919,943 by \$2,240,352, or a loss of \$1.28 per share.

New Firm Delivers First \$150,000 Graphics Terminal

SALT LAKE CITY, Utah — Evans and Sutherland Computer Corp., a new arrival in the computer industry, has made delivery of its first unit, according to Dr. Ivan E. Sutherland, president. The line drawing system (LDS) Model 1, a product of Sutherland's pioneering efforts in the computer graphics field, was delivered to Bolt, Beranek, and Newman, Inc., of Cambridge, Mass.



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January 6

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NEW YORK
January 22

MIAMI
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An Open Letter To Our Customers

Dear Sirs:

This is the time of year when we at COMPUTERWORLD review the past and preview the future.

This year's review is most gratifying. We have more subscribers, we've carried more editorial material, and in the last 6 months we've carried more advertising than any other computer industry publication.

The preview of our future is equally gratifying. We will expand our editorial coverage, we will print special industry supplements, and we will carry an even greater variety of advertising for computer industry goods and services.

None of the past, nor any of the future would be possible without you — our subscribers and advertisers — our customers. Thank you for this past, and thank you in advance for the future.

We are proud to share with you in an industry growing at the rate of one billion dollars a year.

May we at COMPUTERWORLD extend to you our best wishes for this Holiday Season, and continued prosperity in 1970.

Sincerely,

Neal Wilder

Neal Wilder
National Sales Manager

Orders and Installations

The Medical Center of Florissant, Mo., will enlist the aid of an IBM mini-computer to reduce the paper work crisis resulting from a patient load that has increased more than 12% over last year. The System/3 will be used to analyze health care trends and needs in addition to handling accounting and supplies inventory.

Logic Corp. of Haddonfield, N.J., sold an LC-720 keydisk data input system to Capitol Milk Producers Cooperative, Inc. of Washington, D.C. The dairy uses the system, which is valued at \$126,000, to service daily orders for 183 retail stores in Washington. The system was installed at the dairy on Aug. 22, and final acceptance of the system was completed on Oct. 22.

Beginning in 1970, a network of terminals, operated by Computicket Corp. of Calif., will provide instant confirmations and reservations to 67 campgrounds in the California State Park system. A prospective camper will be able to indicate the park and dates that he desires at a local Computicket center, and in a few seconds a display screen will indicate if space is available, and if not, what the alternatives are.

A Silver Spring, Md.-based company, Icarus Corp., has announced the installation of its Cost system in its student version on the University of Maryland Univac 1108. The system is a computerized chemical processing plant cost estimating system that cuts process design and cost estimating time requirement from man-months to man-hours. The output is in English language and consists of a profit projection and a fixed capital cost estimate that is immediately useful to corporate managers and planners.

The first two 68A series have been installed by Computer Corp. of America in the nuclear medicine departments of Parkland Memorial Hospital, Dallas, and the M.D. Anderson Hospital and Tumor Institute in Houston. Each of the systems is being used on-line with complex nuclear medical gamma imaging instrumentation (gamma cameras) for the production of image and printout analyses of camera-derived data.

West Midlands Gas Board of Solihull, England, has ordered a computer system from International Computers Ltd. of London for use in an advanced real-time enquiry service. The system includes a 1904A central processor, duplicated communications processors, two 741-million-character fixed disk files, and additional tape and disk units.

NCR Century 100s are scheduled for installation in the Bank of Stockton, Stockton, Calif., the First and Farmers National Bank of Somerset, Ky., and the Red Lobster Inns in Orlando, Fla. The two banks will use their computers for general accounting purposes, while the Red Lobster Inns will use their computer for a variety of applications including requisition of food and inventory control. NCR 200s are being installed at the Union Safe Deposit Bank of Stockton, Calif., and the Citizens Union National Bank, Lexington, Ky., for general accounting and some data processing for area businesses, and at the Quaker State Oil Refining Corp., Oil City, Pa., for the development of marketing statistics and general accounting.

Delta Air Lines has placed an order for the electronic retina computer reader from Recognition Equipment, Inc. of Dallas. The system, which is to be installed in November at Atlanta, will optically read data directly from airline tickets and record the information on magnetic tape for further computer processing.

A \$1.9 million Univac 1108 has been ordered by the University of Trondheim, Norway, for use in research, various educational purposes, and university administration.

Multicomp Inc. has installed a second Control Data 3600 in Waltham, Mass., to provide commercial computing services to the New York-Boston area. Customers will be serviced remotely by conversational typewriter-like terminals.

A \$1,800,000 high-speed telemetry data acquisition system has been delivered to Grumman Aircraft Engineering Corp., Bethpage, Long Island. The equipment from Astrodata, Inc. of Anaheim, Calif., will be utilized in conjunction with a CDC-6400 and three CDC-1700s to acquire, process, and reduce real-time data during life flight tests on advanced aircraft.

The Kansas City data centers of Trans World Airlines are installing the data project management system, designed around a computerized backlog file comprising all projects and work assignments within the department, from Lutter and Helstrom, Inc. of Chicago. The new system is expected to improve the economic control and deadline reliability of project assignments.

Republic National Bank of Dallas has ordered an information system from GE. The GE-415 will be added to the bank's computer complex for major applications.

The following companies have ordered Univac 9200s: the Chattanooga Times & Post, Tenn.; Kaiser Steel (one ordered and one installed), Fontana, Calif.; branches of the Institute of Computer Technology at San Antonio, Texas, Richmond, Va., and Edison, N.J.; the City of Easton, Pa.; University of Puget Sound, Tacoma, Wash.; National Institute of Computer Programming, Greenville, Tenn.; Computer Carriers Institute, Bristol, Tenn.; and Dandridge Data Inc., for combined use of the Tennessee Handbags Inc. and Gaby Hosiery Mills Inc.

Univac 9300s have been ordered by Vulcan Corp. of Cincinnati and Batco Manufacturing Co. of Boston for payrolls and general business procedure.

Five manufacturing firms have installed Honeywell systems for a variety of applications. A Model 125 magnetic tape system has been rented by Dynamics Inc. of Lansing, Ill., for general accounting purposes at a cost of \$5,925 per month. Dremel Manufacturing Co., Racine, Wis., is renting a Model 110 at \$2,400 per month for use in order processing and accounting; and Scully Electronics, Wilmington, Mass., is leasing a Model 110 for inventory reporting and order processing at \$2,800 per month. A Model 1250 is being leased by Hillenbrand Industries of Batesville, Inc., for general accounting and inventory planning at \$14,500 per month; and Swift Textiles Inc., Columbus, Ga., is renting a Model 120 for general accounting and inventory control at \$3,700 per month.

RCA's \$1.5 million Spectra 70/46 is scheduled for installation this month at the Prudential Insurance Co. of America, Newark, N.J. The remote computing system will absorb work that is presently contracted to several time-sharing bureaus and extend computer service to problem solvers and information seekers.

The first of two small computer-based time-sharing systems has been delivered to TransNet Corp., Red Bank, N.J., by the Digital Equipment Corp. of Maynard, Mass. The TSS-8 is designed for multipurpose, multilanguage time-sharing and includes a DEC PDP-8/1.

CMC Constructs 2-Story Addition

SKOKIE, Ill. — Computer Management Consultants, Inc., 5214 W. Main St., have begun construction of a two-story addition to its existing corporate facilities that will triple research and development office space from the current 6,500 sq ft to 18,500 sq ft.

Expansions

In addition to the current construction, CMC owns another 35,000-sq-ft of land around its existing facilities. According to a company spokesman, the remaining land will be used by the company to meet anticipated future growth requirements.

Computer Management Consultants is a computer product research and development firm whose staff combines the latest knowledge in computer hardware capability with programming skills to create programs and systems as an end-product for sale.

CompuNet Running 6 Weeks Ahead of Schedule

RALEIGH, N.C. — Occidental Life Insurance Co. of North Carolina, through its subsidiary, Computers International, Inc., has announced that its Australian-based computer utility, CompuNet, Ltd., in Sydney, will be ready for operation six weeks ahead of schedule.

When the formation of the company was announced in mid-July, it was stated that the Univac 1108, the heart of the utility, would be installed in mid-December. However, a company spokesman said that the computer arrived in mid-October and has now been installed.

Tests were now being carried out on compilers and other basic software and program packages, and it was expected that CompuNet would be in a position to service customers by the beginning of November.

New Plant For Honeywell

BILLERICA, Mass. — Honeywell's electronic data processing division has begun construction here of a five-story, 150,000-sq-ft engineering office building. It is adjacent to a 173,000-sq-ft manufacturing plant on a 65-acre site along Concord Road, west of Route 3.

The plant, which produces random access computer information storage and retrieval units known as disk drives, also serves as the headquarters for the division's peripheral device operations. It was dedicated in June.

Other Expansions

Information Technology & Systems, Inc., parent corporation of Industrial Computer Laboratories, Inc. of Salt Lake City, Utah, manufacturer of the Command 690 series of computer systems for general and specialized applications, has announced the establishment of a new engineering, research and development facility in southern California.

The Ikon Data Systems division of Synergistics, Inc. of Seattle, Wash., has moved to enlarged quarters at 2619 Second Ave. The move to the new location gives Ikon four times the space it had in its previous location.

Computer Development Corp. of Dallas, Texas, has moved to a new location at 3001 Daimler St., Santa Ana, Calif. 92705. The building contains a total of 24,000 sq ft with offices occupying 8,000 sq ft. Research and development, manufacturing, and shipping will occupy the remaining 16,000 sq ft. The new southern California location is in the Irvine Industrial Complex and is near the Orange County Airport.

Safeguard Industries, Inc. has moved its

corporate headquarters to 630 Park Ave., King of Prussia Industrial Park, Montgomery County, Pa. The move consolidates into one location all of Safeguard's corporate functions, including the corporate finance, marketing, legal, and tax departments. The company, which produces information systems and diversified products, occupies over 10,000-sq-ft of space in the new building.

Diversified Numeric Applications has opened a southwest regional sales office at 11426 Cliffgate Drive, Houston, Texas. DNA manufactures computer-based automated clinical laboratory systems for use in hospitals and (medical) clinical laboratories.

Slent Computer Corp. has announced the opening of a new office in Union, N.J. The company is active in general employment placement, finance, and equipment leasing, data processing services, technical publishing, and business education.

Computer Technology, Inc. has signed a long-term \$3-million lease on its headquarters in Skokie, Ill. The five-year contract calls for the company to occupy 82,000-sq-ft on five floors of a recently constructed six-story building. Computer Technology provides computer management services to commercial, industrial, and governmental organizations.

Digital Equipment of Canada Ltd. is expanding its manufacturing plant in Carleton Place, Ontario. The expansion is designed to add 12,000-sq-ft of manufacturing space necessary to house 49 new wire-wrap machines for increased production in computer sub-assemblies.

Cognitronics Corp. has announced the opening in Chicago of its third remote optical character recognition data processing operations center. The new Chicago office is located at 222 W. Adams St.

Harris-Intertype Corp., Cleveland, Ohio, has opened a typesetting laboratory for use by both owners and prospective owners of its Fototronic CRT, a computerized cathode ray tube phototypesetting system.

Software Applications Corp. has moved to new offices at 1345 Avenue of the Americas in New York.

Information Storage Systems has started construction of a 70,000-sq-ft expansion to its Valco Industrial Park facility at 10435 N. Tantau Ave., Cupertino, Calif. The company manufactures a line of high-performance disk storage drives and storage control units. Manufacturing and administration will be housed in the new addition.

Fabri-Tek, Inc., Minneapolis, has announced plans for the construction of a new manufacturing plant in suburban Philadelphia for the production of magnetic memory cores for use in computer products. The plant will be operational by the end of January, according to a company spokesman, and will be located near the site of the present plant in the Fort Washington Industrial Park.

Optimum Systems, Inc. has opened regional offices in Dallas, extending its computer capabilities to Texas and surrounding states. The Dallas office will service Arkansas, Kansas, Louisiana, Missouri, and Oklahoma as well as Texas. The installation is located at 723 Exchange Bank Tower.

Alpex Computer Corp., Danbury, Conn., has moved its main office, production, and research facilities to a 50,000-sq-ft single story building located on a five-acre site in Commerce Park, Danbury. Alpex manufactures point-of-sale computer-cash register systems for retailers.

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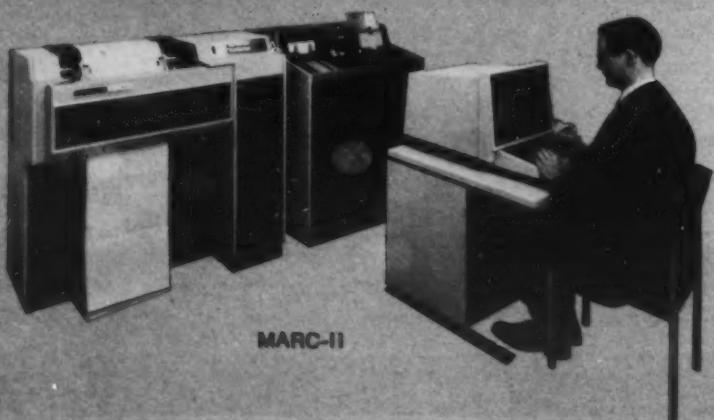
Control Data's CYBERNET System is a network of computer centers located in 29 cities across the United States and worldwide. With CDC 6600 and 3300 computer systems, these centers provide a perfect combination of computing power and high capacity data

processing capability. Problems that would take hours or days on medium-sized computers are solved in seconds or minutes with the 6600 supercomputer — a factor that means substantial savings in both time and costs.

And, there's no minimum charge for computer time with the CYBERNET System — you pay just for the resource you use for the time which you actually use it. All the computer capacity you need for peak loads is in this network, and it's only as far away from you as your telephone outlet.

CDC's MARC-terminals can be used to augment your present computer system, for testing and debugging programs, or as a primary data processing source. There's a complete line of systems and peripherals to choose from—with input/output capacities ranging from 10 to 6000 bytes-per-second.

Pick out the terminal that fits your needs, select the peripherals you want, and install the system *without* the usual problems of environmental control, false flooring, etc. Most systems are ready to run the day they're installed. Your terminal will be tied into the CYBERNET center nearest you—either by voice-grade or wideband telephone lines. Software includes the most complete versions of FORTRAN and COBOL, as well as a comprehensive library of special programs

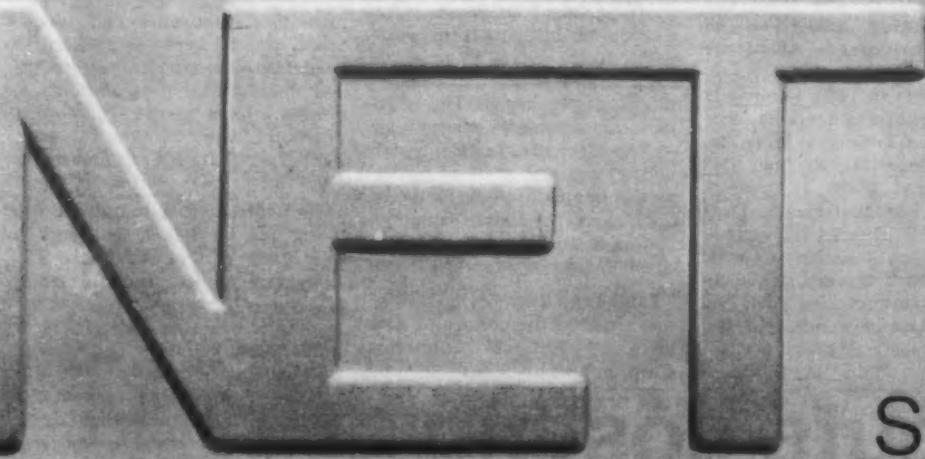


MARC-II



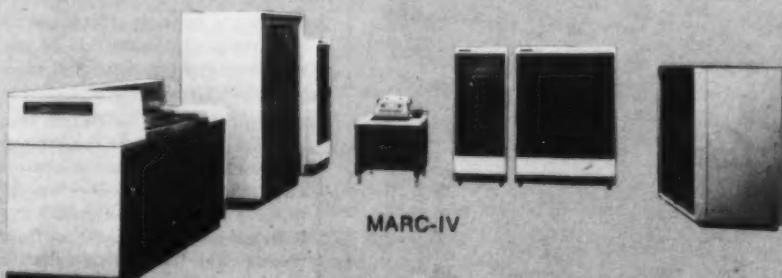
MARC-III

TM



system

Remote Terminals.



—ALGOL, SIMSCRIPT, OPHELIE II, and systems for assigning zip codes to street addresses, for structural analysis, for analysis of random data, for tabulating and analyzing survey data, to name a few.

And now we have two new software systems that help you use the full potential of the CYBERNET Sys-

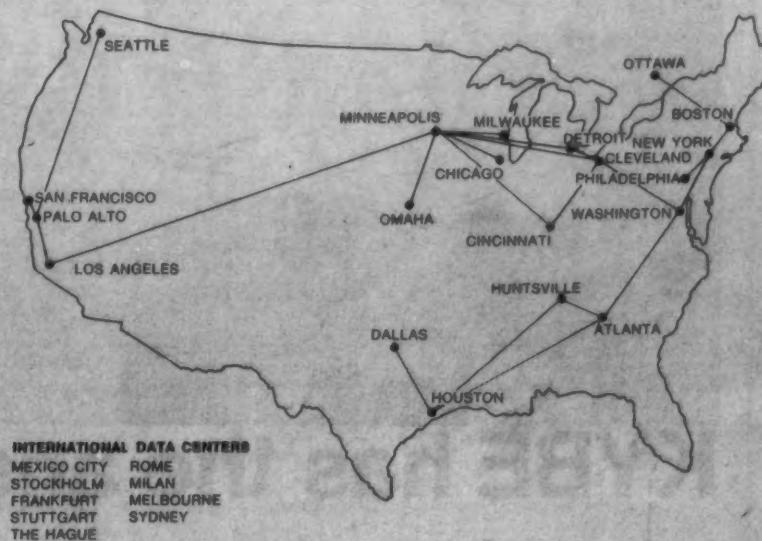


tem—SHADOW and SHADE. SHADOW is a system that allows you to select any 3300 or 6600 in the CYBERNET System, or a combination of both, to solve your problem with optimum efficiency and economy. In addition, the powerful command and control features of SHADOW allow you to direct the scheduling and routing of your work flow. SHADE is a system that provides you, from your own site, the capability to store data files at the CYBERNET center so all you have to transmit for any problem is new input or changes. You can alter, update, search or copy files from your own terminal.

Take a few minutes to

MARC-V

find out exactly what the CYBERNET System and MARC-terminals can offer your firm. Call your nearest CDC Data Center, or contact us directly.



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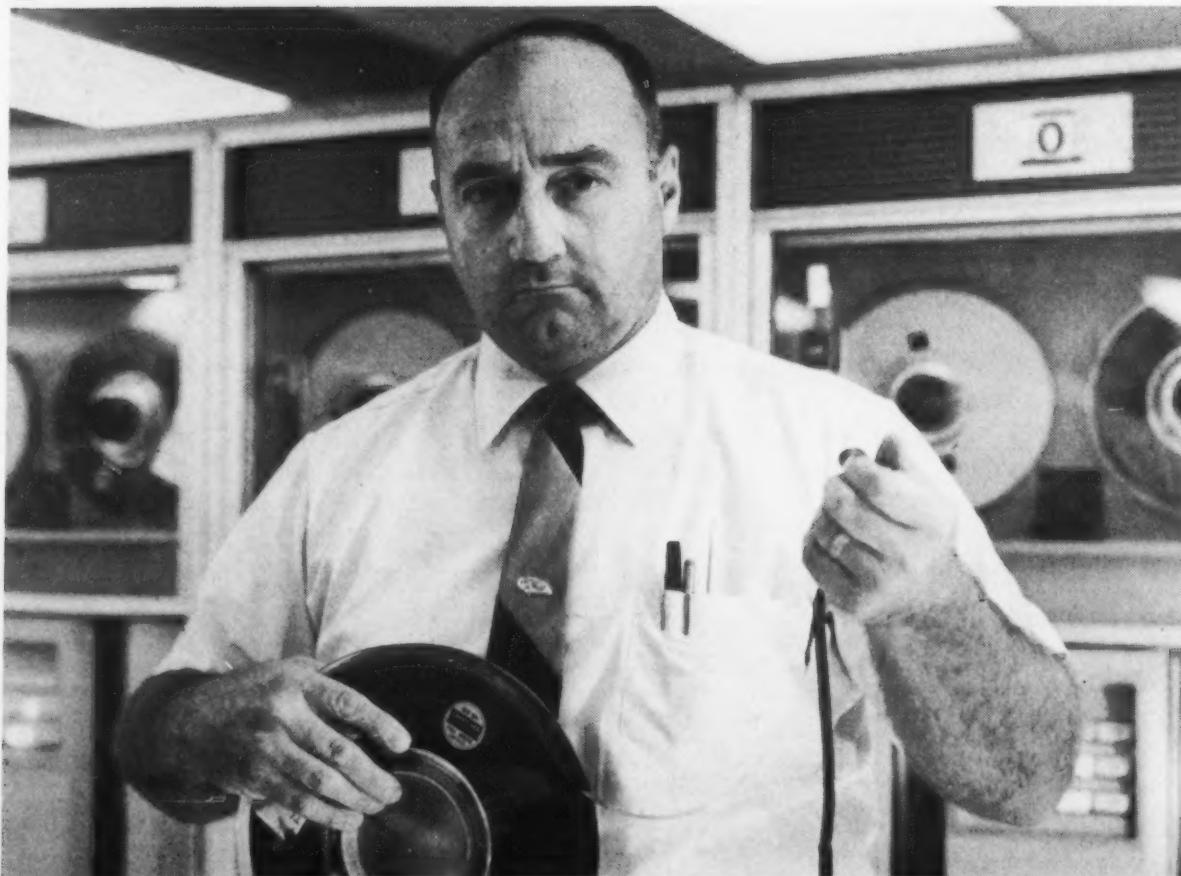
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Skips and dropouts costing you money?



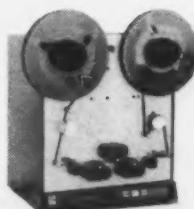
KYBE has the answer.

Dropouts have long been one of the major hidden costs of computer operations. These costs can easily reach tens of thousands of dollars each year. The vast majority of dropouts and reruns are caused by the build up of oxide dust and other particles contaminating tape surfaces.

Significant savings in unnecessary write retries, read retries and reruns for lost data can be realized with KYBE.

KYBE Tape Cleaners are now being used in over 3000 computer installations around the world.

KYBE Tape Cleaners can double clean a 2400-foot reel of tape in 5 minutes; remove oxide dust, embedded particles, and give uniform edge-to-edge cleaning without the slightest damage to tape or recorded data.



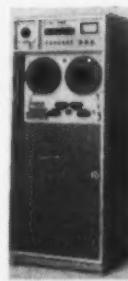
KYBE Tape Testers can augment KYBE Tape Cleaners in a Library Management system by evaluating existing tapes. Hypercritical testing criteria can be applied to identify bad tapes before they fail during operation. Simple to use KYBE Tape Testers provide documented reports on tape error counts... decision-making information for tape inventory and replacement expenditures.

For more information on Tape Library Management and KYBE Tape Cleaners and Testers write or call:



KYBE CORPORATION

132 Calvary Street, Waltham, Mass. 02154
(617) 899-0012



New Registrations

BROKER DATA, INC., 2160 Dain Tower, Minneapolis, Minn. 55402, a company whose principle activity is data processing, utilizing an IBM 360/20 which is leased from IBM, filed to register 167,875 shares of common stock. John Stephens & Co., Inc., which owns 320,000 Broker Data shares (48.49%), proposes to offer 167,875 shares as dividend to its stockholders of record July 31, 1969, at the rate of one Broker Data share for each two Stephens common shares held and 2-1/2 Broker Data shares for each Stephens convertible preferred share held.

COMPUTER TOOLS, INC., 475 Fifth Avenue, New York, N.Y., a company providing data processing services filed to register 200,000 shares of common stock. Proceeds, at \$5 per share maximum, intended for general working capital. No underwriter is involved.

Aquisitions

Diversified Technologies, Inc., New York, a wholly owned subsidiary of The Singer Co., has provided capital in exchange for substantial ownership of four manufacturing and computer programming subsidiaries of Brogan Associates in accordance with a previously signed definitive agreement. The companies are: Magnetic Recording Systems, Inc.; Peripheral Data Machines, Inc.; Miteq, Inc.; and CompuMent Corp. The subsidiaries are headquartered on Long Island, N.Y. Diversified Technologies makes available scientific and engineering expertise, management counsel, and advice to selected companies. Brogan Associates is a technical marketing organization in the data

systems field with main offices in Westbury, Long Island.

Cybermatrics, Inc., Fort Lee, N.J., a computer services company, and Carci Computab Systems, Inc., Hauppauge, N.Y., a computer business forms company, have agreed in principle for the merger of Carci Computab into Cybermatrics. The agreement contemplates that public shareholders of Carci Computab will receive one share of Cybermatrics common stock for every 2.17 shares of Carci Computab common stock held on the date of the merger.

Fabri-Tek, Inc., Minneapolis, has acquired the connector division of National Connector Corp. in an agreement signed by

Oyer Infoservices, Inc. of New York has purchased the stock and assets of Oyer Professional Computer Services, Inc., formerly a subsidiary of Computer Age Industries of Fairfax, Va., for an undisclosed amount. The Oyer Co. will continue to provide a full range of on-site computer education and consulting services to professional organizations, business, industry, science, government, and educational institutions.

Datatron Inc., Santa Ana, Calif., has agreed in principle to acquire Shelly Associates, Inc. of El Segundo, Calif., for an undisclosed amount of Datatron common stock. The acquisition is subject to approval of the boards of directors of both companies and regulatory agencies. Datatron manufactures timing instrumentation, computer control test equipment, digital data systems, and broadcast devices. Shelly manufactures visual display components used primarily in computer peripheral equipment.

Calculator-Computer Leasing Corp. of Pittsburgh has acquired Management Information Center, Inc., San Juan, Puerto Rico, a computer service center. The purchase was carried out with CCLC stock. Calculator-Computer Leasing is engaged in the manufacture and sale of service station equipment and electric motors and coils.

Computing and Software, Inc. of Los Angeles has acquired Gratian J. Meyer and Associates and three affiliated corporations: Farragut Associates, Kaye Sullivan Associates, and Data Names. The transaction calls for the initial issuance of an undisclosed number of shares of C&S common stock with possible additional shares based on future earnings of the company. G.J. Meyer and its affiliated companies are headquartered in Washington, D.C.



emerging enterprises

DPA Operates Facilities Management Subsidiary

NEW YORK — DPA Management Systems, Inc., a company specializing in computer facilities management, has been formed by DPA, Inc., a diversified Dallas-based company.

A wholly owned subsidiary, DPA Management Systems will operate a facilities management center in Dallas to serve the Ft. Worth and Dallas computer users market.

It will initially use an IBM 360/30 which will be in operation later this month.

DPA Management Systems will concentrate on facilities management for smaller to medium size computer users.

The Dallas/Ft. Worth center could perhaps serve as a model for similar centers operated by DPA Management Systems in other parts of the nation.

DPA, Inc., founded in 1960, is a diversified company engaged in the leasing and servicing of data processing equipment.

Other New Subsidiaries

★ Scientific Resources Corp., Philadelphia, has established a new Mauchly computer software subsidiary, International Data Applications, Inc.

The subsidiary will develop and market proprietary software packages.

★ Financial Computer Services, Inc., has been formed by Gulf Life Holding Co. in Florida.

According to Paul A. Myers, president, this move is expected to generate additional earnings for the holding company through the development of generalized systems and programs which will be used by more than one subsidiary.

At present the new firm is providing all the data processing services for Gulf Life Insurance Co., one of the member companies.

Fuller utilization of the data processing equipment installed in each of the subsidiaries is also anticipated.

★ Recognition Equipment Inc., Dallas, has formed a wholly owned subsidiary, Recognition Terminals Inc., Washington, D.C., to develop a family of remote terminals based on Recognition Equipment's advanced optical character technology.

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PHONE 215-563-7676

puter systems involving time-sharing and other on-line applications indicates there will be major requirements for these remote OCR terminals," the company says.

These devices permit direct reading of conventional documents, whether machine-printed or printed by hand, at source locations for transmitting to central processing units.

The systems education division develops properly trained operating personnel and executives oriented to the computer's capabilities and limitations. It conducts special-interest seminars throughout the U.S., produces customized training courses, and publishes manuals, textbooks, and other instructional materials to keep professionals up-to-date on developments within the electronic data processing field.

The systems software division provides various support func-

Firm Serves Customers With 3 Divisions

DALLAS — Computer & Systems Resource Management, Inc. will specialize in increasing customers' use of computer techniques through education, software functions, and facilities management services.

The Dallas-based firm consists of three coordinated divisions.

Its systems education division develops properly trained operating personnel and executives oriented to the computer's capabilities and limitations. It conducts special-interest seminars throughout the U.S., produces customized training courses, and publishes manuals, textbooks, and other instructional materials to keep professionals up-to-date on developments within the electronic data processing field.

The systems software division provides various support func-

tions for organizations using computer systems for needs specific to the diverse industries they represent.

The facilities management division undertakes top-level studies in the financing, feasibility, and operational aspects of computerization for its clients. In addition, when desired, this unit will actually manage and staff the customer's computer activities, placing a team of executives and operational specialists on-site to operate the customer's system.

The company intends to specialize in offering services to the metals service center and structural steel fabricating industry.

It also plans to offer services to other distribution and metal working industries.

Other New Companies

★ MDC Systems, Inc., a recent-

ly formed Montgomery, Ala., computer software and consulting firm, specializes in software application packages for small businesses.

★ Data for Management Decisions, Inc., a management science and computer consulting firm, has been formed in Rich-ton Park, Ill.

The company provides consulting service and management assistance and analysis for computer applications, and systems designs and programming for commercial and industrial companies.

★ Computerwares, Inc., is a computer software and systems company that operates a data center in Birmingham, Ala., and offers a structural steel detailing service. Other data centers and software companies will be acquired, the company says.

Big banks, little banks, XiOX Sav-A-Matic Software fits the need & the budget.



One of the larger banks in the country, with assets in excess of \$1.1 billion, uses XiOX financial software.

So does Continental National Bank of Phoenix with assets of \$32 million.

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Obviously the large national bank has the know-

how to do its own programming. And just as obviously, Continental National has to budget with a sharp pencil.

Why should they both choose XiOX software? Because you couldn't write a better program yourself for \$100,000 — and the XiOX price tag is only \$12,600.

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E. Engineering/Scientific
F. Production/Maintenance
G. Sales/Marketing
H. Other _____

COMPANY BUSINESS:

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2. Manufacturer/Computer or Data System
3. Manufacturer/Other
4. Utility
5. Wholesale/Retail
6. Finance
7. Consultants/DP Services
8. Business Service (except DP)
9. Educational/Medical/Legal
10. Government/Military
11. Other _____

Earnings Reports

ADDRESSOGRAPH-MULTIGRAPH

Three Months Ended Oct. 31
 1969 1968
 Shr Ernd \$.42 \$.41
 Revenue 96,129,000 90,615,000
 Earnings 3,388,000 3,249,000

BETA INSTRUMENT CORP.

Three Months Ended Sept. 30
 1969 1968
 Shr Loss \$.12 \$.04
 Revenue 244,328 158,242
 Loss 129,740 28,901
 9 Mo Shr (Loss) .31 .14
 Revenue 616,465 441,419
 Loss 322,310 a109,810
 a-This figure does not include recoverable Federal Income Taxes. This report is unaudited.

COLLINS RADIO CO.

Three Months Ended Oct. 31
 1969 1968
 Shr Ernd \$.18 \$.69
 Revenue 91,000,000 95,000,000
 Earnings 532,000 2,100,000

COMPUTER SCIENCES CORP.

26 Weeks Ended Sept. 26
 a1969 b1968
 cShr Ernd \$.44 \$.23
 Revenue 40,846,000 31,826,000
 Earnings 5,285,000 d2,819,000

a-The company's fiscal year ends March 27, 1970; b-26 weeks ended Sept. 27, 1968; c-Based on 12,147,000 average outstanding shares in the 26 weeks ended Sept. 26, 1969, and, after adjustment for a five-for-two stock split in June 1969, 11,874,000 average shares in the comparable period ended Sept. 27, 1968; d-Includes \$387,000, or 3 cents per share, from gain on sale of securities.

DATA DOCUMENTS INC.

Year Ended Sept. 30
 1969 1968
 aShr Ernd \$ 1.77 \$ 1.44
 Revenue 20,930,342 17,221,078
 bTax Cred 77,317 18,500
 cEarnings 902,966 690,322

a-Based on income before tax credits; b-From tax loss carry-forwards; c-Equal to \$1.94 a share in 1969 and \$1.48 a share in 1968.

LUNDY ELECTRONIC & SYSTEMS

Three Months Ended Sept. 30
 1969 1968
 Shr Ernd a\$.05 a\$.18
 Revenue 3,399,198 3,989,310
 Tax Cred 12,296 4,179
 Earnings b52,149 b159,325

a-Based on income before tax credit; b-Equal to six cents a share in 1968.

REDCOR CORP.

Three Months Ended Sept. 29
 1969 1968
 Revenue \$1,858,000 \$1,330,400
 Loss 17,900 26,100

PROGRAMMING SCIENCES CORP.

Three Months Ended August 31
 1969 1968
 aShr Ernd \$.08

Revenue 685,088 \$476,964
 Earnings (Loss) b103,409 (192,693)
 a9 Mo Shr .13
 Revenue 1,911,907 1,051,288
 Earnings (Loss) b200,999 (240,736)

a-Based on income before tax credit; b-Equal to 11 cents in the quarter and 22 cents in the nine months period.

POTTER INSTRUMENTS CO.

Three Months Ended Sept. 30
 1969 1968
 Shr Ernd \$.14 a\$.11

Revenue 7,166,800 4,639,600
 Spec Cred b327,100
 Earnings 337,200 c596,000
 a-Based on income before special credit; b-Consisting of net gain of \$769,100 from sale of investment less \$442,000 net loss on discontinued product line; c-Equal to 24 cents a share.

DATRONIC RENTAL CORP.

Year Ended June 30
 1969 1968
 aShr Ernd \$.44 \$.33
 Revenue 2,779,211 1,425,589
 Earnings 259,956 173,656
 a-Based on pro forma share earnings.

DATASCAN, INC.

Three Months Ended Sept. 30
 1969 1968
 Shr Ernd \$.31 \$.28
 Revenue 2,921,898 824,230
 Earnings 106,773 74,229
 9 Mo Shr .89 .78
 Revenue 7,094,571 2,421,293
 Earnings 302,355 203,697

ENERGY CONVERSION DEVICES, INC.

Year Ended June 30
 1969 1968
 Shr Ernd \$ 1.01 \$.76

Revenue 549,048 224,047

aLoss 1,027,175 714,210
 a-Based on average total shares outstanding during the year for both classes of capital stock, adjusted for the 5.25-for-1 stock split in Aug. 1967.

INTERNATIONAL COMPUTER

Six Months Ended Sept. 30
 1969 1968
 Shr Ernd \$.13 \$.04
 Earnings a115,323 27,689
 a-Includes a non-recurring profit of \$10,108 on sale of computer equipment held for leasing.

PEPI, INC.

Nine Months Ended Sept. 30
 1969 a1968
 Shr Ernd \$ 2.25 \$ 1.64
 Revenue 130,383,000 124,645,000
 Earnings 6,481,000 4,701,000
 Shr Loss \$ 1.01 \$.76

a-Restated to give effect to the ac-

quisition of Leffingwell Chemical Co. accounted for as a pooling of interest.

UNITED TELEPHONE SYSTEM

Year Ended Sept. 30

1969 1968
 Shr Ernd \$ 1.30 \$ 1.24
 Revenue 289,788,000 249,686,000
 Earnings 36,430,000 34,114,198
 9 Mo Shr .96 .87
 Revenue 221,951,000 191,243,000
 Earnings 27,101,000 a24,196,000

a-Restated to reflect subsequent mergers on a pooling-of-interest basis.

VERNITRON CORP.

Nine Months Ended Sept. 27
 1969 a1968
 Shr Ernd \$.90 \$.76
 Revenue 33,645,629 31,913,352
 Earnings 2,569,058 2,721,423
 a-After adjustments for subsequent

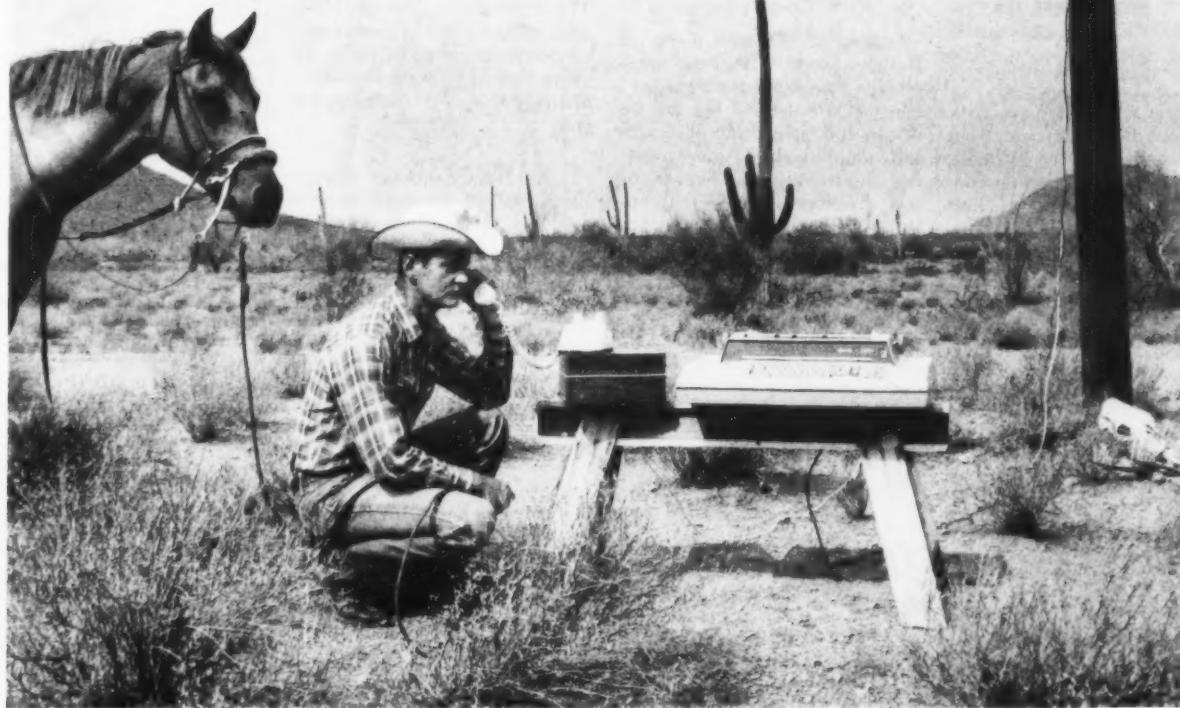
poolings of interest; b-Extraordinary items were one cent in 1969 and 21 cents in 1968. On a fully diluted basis, earnings per share before extraordinary items for the 1969 period would be 76 cents and extraordinary items one cent. For the 1968 period, fully diluted earnings per share before extraordinary items were 63 cents and extraordinary items 18 cents.

WELLS MANAGEMENT CORP.

Three Months Ended Sept. 30

1969 1968
 Shr Ernd \$.24 \$.28
 Revenue 1,503,633 1,123,848
 Earnings 192,251 208,409
 6 Mo Shr .57 .58
 Revenue 3,232,744 2,278,139
 Earnings 449,864 429,228
 a-Restated for company acquired on a pooling-of-interest basis. This report is unaudited.

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The 1051 Dura terminal talks with 360's through paper tape, edge cards and the keyboard, while the 1021 features only the keyboard and printer functions. And when you are off-

line, the 1051 becomes an automatic electronic typewriter that lets you type documents—letters, contracts, forms, whatever—even do batch processing, automatically. That's versatility to go with Dura portability and compatibility.

Both Dura terminals can transmit and receive through acoustic couplers, Dataphones or limited distance adapters. And they really are light so you can carry them wherever you need them. One last nice thing about compatible, versatile, portable Dura terminals. They're affordable. For down-to-earth facts and information send the coupon below.

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Contracts

The Atomic Energy Commission has begun development of a computer-based system to automate Nuclear Science Abstracts, the principle abstracting journal devoted to nuclear science. The basis of this system is a Digital Equipment Corp. PDP-10, three small DEC PDP-8s and 24 of the company's KV graphics displays. Initially, the system will be used in the production of the abstract portions of the journal, and various index systems will ultimately be put on the new system.

Under a \$270,000 contract, Time-Sharing Terminals of Washington, D.C., will provide 200 teletypewriter terminals and telephone couplers for Marriott Corp. of Washington, D.C. The remote access terminals will be used in Marriott's chain of restaurants, cafeterias, and airport flight kitchens.

Under a \$2.5 million contract, multiple units of Iodisc Series 1000 data storage systems from Iomec, Inc. of Santa Clara, Calif., will be integrated as a standard peripheral addition to Hewlett-Packard 2000 series general purpose computers. The Series 1000, which is a disk memory system tailored for small and medium computers, will be used on the Hewlett-Packard models which are particularly suited to communications, educational, scientific and industrial measurement applications.

Comsonic Corp. of New York has received a contract from Computer Transceiver Systems, Inc., N.J., for a computer-controlled testing system. This system will give CTSI the capability to test several terminals simultaneously.

An on-line bank management information system will be installed by Affiliated Computer Systems, Inc. of Dallas at the Commonwealth National Bank,

Dallas. The system will enable bank officials to obtain total financial information about their customers, such as demand deposits and commercial loans, from a terminal located in the bank.

Under a contract valued at \$324,000 over a three-year period, Delta Data Systems will handle the data processing operations of Cooperativa Cafeteros in Ponce, Puerto Rico. Delta Caribe, a subsidiary of Delta Data Systems, will select and install a computer for Cafeteros, and provide all technical, operation, and managerial support necessary to operate the data processing complex for the next three years. Accounting and inventory, and the insurance and loan operation, are among the applications to be automated for the farmers' cooperative.

Western Union has completed the first phase of a two-year modernization program to increase the speed, capability, and reliability of the Department of Defense's automatic digital network (Autodin) that provides high-speed interchange of vital communications for the defense establishment. The center, located at the U.S. Marine Corps supply center, Albany, Ga., is the first of nine domestic Autodin complexes to be modernized.

Automated Systems Corp., a Houston-based computer applications firm, has been awarded a contract from Shell Oil for the design and installation of its first fully computerized refinery utilities control center. The center will be located in Shell's refinery, Deer Park, Texas, and will provide centralized monitoring of all of the plant utilities, including air, electricity, gas, steam, and water.

Nasa Manned Spacecraft Center has awarded TRW systems group of Redondo Beach,

Calif., a contract to design and build picture enhancement equipment that will be installed in the manned space flight network to remove the voice and telemetry signals that are sent simultaneously with the television picture signals. The TRW equipment will employ amplitude and phase extraction communications techniques to neutralize interference signals, and to allow Nasa to clarify picture transmission so that realistic color pictures can be received from the lunar surface.

A \$243,850 contract has been received by Optronics International, Inc. of Burlington, Mass., from the U.S. Naval Observatory for the manufacture of a high-precision computer-controlled optical-scanning system for the measurement of star images.

Data Logics, Inc., a wholly owned subsidiary of Globe Insurance Co., Cleveland, Ohio, has awarded Time-Sharing Terminals a contract for \$130,000 to supply remote access teletype terminals and telephone couplers for the firm's commercial time-sharing customers.

Tel-Tech Corp. of Silver Springs, Md., has received a contract to install 10 of its TTC-1000 data communications multiplexers for the nationwide time-sharing network being implemented by Scientific Time Sharing Corp. of Washington, D.C.

Delta Data Systems' management systems division, Washington, D.C., has been awarded a \$100,000 contract by the U.S. Army Mobility Equipment Research and Development Center, Fort Belvoir, Va. The contract calls for revising and updating the *Engineers' Handbook for Configuration and Technical Data Management*.

programming, and computational techniques, and provides consultation, technical guidance, and coordination in the use of scientific computation for local Air Force organizations.

To support and expand its many scientific and engineering projects, ASD will replace two existing systems with a CDC 6600 capable of executing more than 3 million instructions per second, early in 1970.

A CDC 6500 system will be installed 18 to 24 months later. Each system will have 35 to 40 remote terminals, including CDC 200 user terminals, graphic displays, teletypewriters and high speed CDC 8231 batch processing terminals.

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European Communication Interests

Our Vice President of European Operations
will be in the U.S. from December 29 to January 9.

He will be available for consultation or
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COMPUTER STOCKS: TRADING SUMMARY

WEEK ENDED DEC. 5, 1969

COMPUTER SYSTEMS

EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE
N	167-120	158 3/8	BURROUGHS CORP	- 2 5/8 -1.63
N	69- 37	37 7/8	COLLINS RADIO	- 6 -13.68
N	159-110	115	CONTROL DATA CORP	- 3 5/8 -3.06
A	102- 54	92	DIGITAL EQUIPMENT	- 3 -3.16
N	25- 11	11 5/8	ELECTRONIC ASSOC.	- 2 1/2 -17.70
N	98- 76	79 1/8	GENERAL ELECTRIC	- 1 -1.25
N	114- 75	101	HEWLETT-PACKARD CO	+ 1 1/8 1.13
N	157-107	143 1/2	HONEYWELL INC	- 3 -2.05
N	368-291	357	IBM	---
N	157-188	144 1/2	NCR	+ 1/8 +1.17
N	48- 35	36 5/8	RCA	- 1 3/8 -3.62
N	50- 30	34 5/8	RAYTHEON CO	- 1 3/8 -3.82
O	43- 4	4 1/2	SCI. CONTROL CORP.	- 1/2 -10.00
N	55- 38	43 1/8	SPERRY RAND	- 1 -2.27
A	51- 26	49	SYSTEMS FNG. LARS	+ 2 1/8 4.53

PERIPHERALS & SUBSYSTEMS

EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE
N	85- 59	64 3/4	ADDRESSOGRAPH-MULTI	- 1 1/8 -2.26
O	71- 13	15	ALPHANUMERIC	+ 1/4 1.69
N	49- 32	44	AMPEX CORP	- 1 3/4 -3.83
O	19- 9	14	BOLT, RERANKE & NEW	- 3/4 -5.08
N	17- 9	13	BUNKER-RAMO	- 1 -7.14
A	37- 18	26 1/4	CALCOMP	- 2 -7.08
O	38- 13	13 1/4	COGNITRONICS	- 1 -7.02
A	16- 7	12 1/2	COMPUTER EQUIPMENT	+ 7/8 7.53
A	27- 12	21 1/8	DATA PRODUCTS CORP	+ 1/8 .68
O	22- 13	15 1/2	DIGITRONICS	- 1/2 -3.13
N	83- 43	78 1/8	ELECTRONIC M & M	- 1 3/8 -1.73
O	18- 6	6 1/8	FARRI-TFK	- 1 1/8 -15.52
O	37- 13	15 1/4	FARRINGTON MFG	- 1 3/4 -10.29
O	21- 10	15	INFORMATION DIS	---
A	62- 17	59 3/8	MILGO ELECTRONICS	+ 3 3/8 6.03
A	89- 59	71 1/2	MOHAWK DATA SCI.	- 3 1/4 -4.35
O	118- 42	53	OPTICAL SCANNING	- 4 -7.82
O	31- 18	19 1/4	PHOTON	- 2 1/4 -18.47
A	46- 23	34 1/2	POTTER INSTRUMENT	- 1 1/4 -3.50
O	76- 4	72 1/2	RECOGNITION EQUIP	+ 8 1/2 13.28
N	61- 22	25	SANDERS ASSOCIATES	- 7/8 -3.38
O	85- 28	34	SCAN DATA	- 1 -2.86
O	36- 16	19	TALLY CORP.	+ 1/2 2.70
N	115- 85	104 1/2	XFRON CORP	- 3 3/8 -3.13

SUPPLIES & ACCESSORIES

EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE
O	47- 31	37	ACME VISIBLE	+ 1 2.78
N	22- 11	13 1/2	ADAMS-MILLIS CORP	- 1 1/8 -7.69
O	27- 23	24 1/2	BALTIMORE BUS FORM	- 1/2 -2.00
A	29- 17	22 1/4	BARRY WRIGHT	- 1/4 -1.11
O	44- 26	32	DATA DOCUMENTS	- 2 -5.88
N	42- 28	36 1/2	ENNIS BUS. FORMS	- 3/4 -2.01
N	173- 65	154	HEMOREX	- 17 -9.94
N	118- 94	111 1/2	JM COMPANY	- 1 5/8 -1.44
O	37- 29	35 1/8	MOORE BUS FORMS	- 1/8 -.35
N	49- 36	41 1/2	NASHUA CORP.	- 1 1/4 -2.92
O	48- 38	43	REYNOLDS & REYNOLD	+ 1 2.38
O	31- 23	25 1/4	STANDARD REGISTER	+ 3/4 3.06
N	36- 25	34 1/2	UARCO	+ 1/2 1.47
A	28- 18	16 5/8	WABASH MAGNETICS	- 3/8 -2.21
O	37- 28	36	WALLACE BUS FORMS	+ 1/2 1.41

SOFTWARE & EDP SERVICES

EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE
A	32- 19	21 1/2	APPLIED DATA RES.	- 1/8 -.58
O	14- 5	5 1/2	ADVANCED COMP TECH	+ 1/2 10.00
O	19- 6	6 3/4	ARIES	- 1 1/4 -15.63
A	122- 63	114	AUTOMATIC DATA PRO	- 2 -1.72
O	15- 7	14 3/4	AUTO SCIENCES	+ 1/4 1.72
O	17- 7	9 1/2	BRANDON APPL SYS	+ 1 1/4 15.15
A	21- 9	11 7/8	COMPUTER APPL	- 5/8 -5.00
O	16- 6	12	COMPUTER ENVIRON	- 1/2 -4.00
O	47- 13	13 1/2	COMPUTER NETWORK	- 1 1/2 -10.00
N	34- 19	28 3/4	COMPUTER SCIENCES	- 1 1/4 -4.17
O	40- 8	18 1/2	COMPUTER USAGE	- 2 -16.00
A	72- 37	59 3/8	COMPUTING & SOFT	- 4 1/2 -7.05
O	24- 4	4 1/4	DATAMATION SERVICE	- 3/4 -15.00
O	17- 6	6	DATATAR	- 1 -14.29
O	15- 4	6 1/4	DIGITEX	+ 1/8 2.04
A	38- 9	9 1/4	ELECT COMP PROG	- 1 3/8 -12.94
O	38- 18	17	INFORMATICS	- 3/4 -4.23
O	19- 1	1 1/8	MATRIX CORP.	---
O	22- 4	6 1/2	NAT COMP ANALYSTS	+ 3/4 13.04
A	48- 23	46 7/8	PLANNING RESEARCH	+ 1 1/8 2.46
O	11- 4	4	PROGRAMMING & SYS	- 5/8 -13.51
O	10- 2	2 1/2	SOFTWARE SYSTEMS	+ 1/2 25.00
O	37- 3	3 1/8	STRATEGIC SYS	- 3/4 -19.35
O	36- 11	19	TRS COMP CENT INC.	---
O	12- 3	5	UNITED DATA CENTER	---
N	155- 53	96	UNIVERSITY COMP.	- 3 7/8 -3.88
O	38- 28	26	URS SYSTEMS	- 1/2 -1.89
O	16- 7	7 1/4	U.S. TIME-SHARING	- 2 1/2 -25.64

LEASING COMPANIES

EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE
O	14- 8	8 3/4	BANISTER CONTIN	- 3/4 -7.89
O	45- 24	25 3/4	BOOTH COMPUTER	+ 1/2 1.98
O	18- 4	7 3/4	COMPUTER EXCHANGE	- 1/4 -3.13
A	34- 18	17 1/4	COMPUTER LEASING	- 5/8 -3.50
O	13- 7	11 1/4	CYRER-TRONICS	- 1/2 -4.26
A	68- 23	31 3/4	DATA PROC. F & G	- 2 1/8 -6.27
O	16- 5	6 3/4	DATRONIC RENTAL	- 1 3/8 -16.92
A	52- 24	25 1/4	DEARBORN COMPUTER	- 1 1/4 -4.72
A	16- 8	18	DPA, INC.	---
A	45- 16	25 1/8	GRANITE MGT	- 1 7/8 -6.94
A	28- 12	13 5/8	GRAYHOUND COMPUTER	- 1 1/4 -6.48
N	54- 22	25	LEASCO DATA PROC.	- 3 -16.71
O	9- 4	6	LECTRO COMP LEAS	+ 1/8 2.13
A	57- 17	19 1/4	LEVIN-TOWNSEND CMP	- 1 1/2 -7.23
O	8- 2	2 3/4	LMC DATA, INC.	---
O	14- 2	2 7/8	MANAGEMENT ASSIST	- 1/2 -14.81
O	12- 6	8 1/4	NCC LEASING	- 3/4 -8.33
O	34- 5	5	SYSTEM CAPITAL	- 1/2 -9.09
A	28- 13	17 3/4	U.S. LEASING	- 1/4 -1.39

Computer Stocks Trading Index

By Phyllis Huggins
CW West Coast Bureau

that led to the selection of the 816 and 216 computers.

Also essential was the I/O and software compatibility of the two models. The price range of the computers is \$7,990 to \$9,980.

Company Grows Rapidly

Computer Automation was founded in August 1967 by two men with \$15,000. Within six months there were four men and \$30,000, and the next step was an \$800,000 capital investment by two mutual funds and several private investors.

NDC, a systems company, will use the computers in real-time data acquisition systems that include unique sensor devices and radio frequency communication links for telemetering data collected by the remote mini-computer to a data processing center.

According to Philip Walker, president of NDC, it was memory efficiency and I/O flexibility plus rugged performance margins

want to keep out of the systems business.

"In that business you have men working six months on a special system and when it's completed, that's it. There are no residuals."

"With a product, when your main work is completed, you have residuals."

Methvin notes that the mini-market has bloomed in the past year. He attributes this in part to the fact that two years ago everyone was afraid of computers whereas now everyone wants one; the media have done a very good job of educating people. The price advantage over special purpose computers has also fostered rapid market growth.

According to a Stanford Research Institute report, the 1969 mini-computer market will be \$200 million while the 1980 market will grow to \$1 billion.

To Tap European Market

Computer Automation has an office in Amsterdam and is concentrating on foreign sales in the Nordic countries, particularly Sweden. According to Ray Whitney, marketing vice-president, "Europeans are very cost conscious. Here the engineer wants the newest and the most buttons. Europe can be a very good market for minis."

"We're just tapping the top of the iceberg. Australia also looks good."

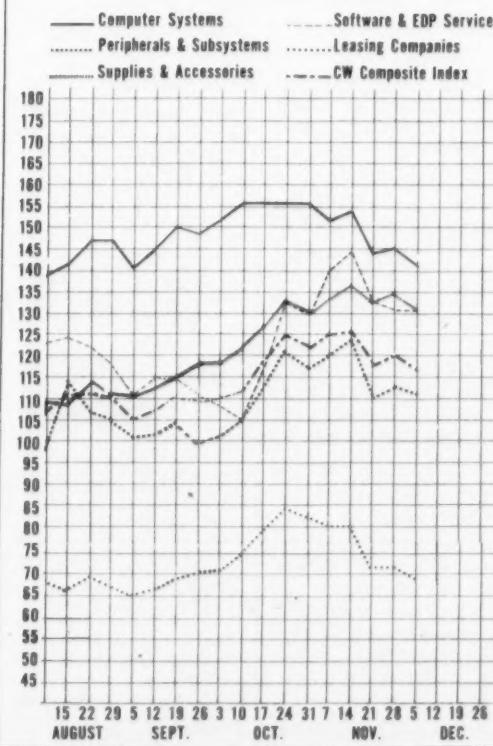
"The foreign market was largely held up by a lack of government funding. Now they're starting to invest vast sums of money into new technologies."

"As a result there is seed money for new companies. It's going to be a real explosion," Whitney concluded.

Still privately owned, CA sees the day when it will have to go public. In the meantime, as Methvin puts it, "We don't have to go public now. There's nothing wrong with making money."

Computer Stocks Trading Index

Computer Systems Software & EDP Services
 Peripherals & Subsystems Leasing Companies
 Supplies & Accessories CW Composite Index



OCR Firm to Buy Datacraft Stock

DALLAS — Recognition Equipment, which just turned the corner from losing money to making money (see page 31), has agreed in principle to acquire 47% of the outstanding common stock of Datacraft Corp., manufacturer of magnetic core memory systems and digital computers.

Recognition will exchange 142,309 shares of its stock for 889,430 shares of authorized but unissued Datacraft common and 499,169 warrants exercisable at \$14 per share. Assuming full dilution of Datacraft equity, Recognition's shares would represent 39% of the outstanding shares, rising to 51% upon exercise of the warrants.

The transaction is subject to the approval of both companies' boards and a definitive agreement. Based on recent bid prices of Recognition, the transaction would have a value of over \$10 million. Datacraft has about 990,000 common shares outstanding.

2 Division Presidents Named for CL&S

WASHINGTON, D.C. — Computer Learning and Systems Corp. has appointed William C. Thompson as president of the firm's software products division and Eugene Axelrod as president of its computer learning division.

Both Thompson and Axelrod will continue as vice-presidents and directors of the parent company.

Thompson is one of the original founders of CL&S, formed in Dec. 1967, as Computer Learning Corp. His position at that time was vice-president for management education and special services. Prior to that time he was regional applications analyst manager for Control Data Corp.

The software products division provides proprietary computer software services and packages, as well as analysis and programming services to government and industry.

Axelrod joined CL&S after serving as executive vice-president of Pacific Technical Analysts, Inc. and in marketing and marketing management positions with Control Data Corp. and RCA. Prior to becoming a director and vice-president he served as assistant to the president. In his new position he will continue to be responsible for the company's computer learning centers in Rockville, Falls Church, Va., and Los Angeles, and for the development of new centers in other locations.

Fimaco Names Swiftlyk Gen. Mgr. in Jamaica

PHILADELPHIA — Fimaco, Inc. has named George Swiftlyk general manager of Fimaco, Ltd. in Kingston, Jamaica.

Swiftlyk's responsibilities include setting up the new facility, starting operations, and initiating a national marketing campaign. Fimaco, Ltd. will offer EDP input services to major industrial corporations: key punching, clerical support, and card-to-tape conversion.

Fimaco, Ltd. will enjoy the special advantages of being in Jamaica: availability of labor, economy, and quick air freight service.

Swiftlyk was formerly president of Systemetrics, Inc. where he was responsible for long-range planning and new business development. In 1964, he established Value Service, Ltd. (now a part of Systemetrics) in Kingston, Jamaica. It became the first offshore key-punch operation to serve U.S. companies in computer input services.

Prior experience includes management of Lockheed Electronics' product and marketing planning group, information technology division. There he established business and industrial applications for special-purpose computer systems and conducted market research studies.

Two New Corporate Officers for Tymshare

PALO ALTO, Calif. — Tymshare, Inc. has named two new corporate officers.

Alden Heintz has been named vice-president, marketing, and Ronald W. Braniff, general manager of Tymshare's eastern division, has been named a vice-president.

Heintz, a veteran of 13 years in

Executive Corner

computer technology, is responsible for market research and planning, business analysis, marketing support, and corporate communications for both the national and international time-sharing operations. Prior to joining Tymshare in 1968, Heintz was associated with Control Data and was general manager of CEIR's largest data center in Washington, D.C.

Braniff, who joined Tymshare in 1966, was recently named general manager of Tymshare's eastern division and is based in Englewood, N.J. He had served as northwestern division manager, and prior to joining Tymshare was associated with IBM in the San Francisco bay area.

Other Recent Moves

■ James F. McGill has been appointed vice-president of national operations for Executive Relocation, Inc. in Wellesley Hills, Mass. In his new post, McGill will be responsible for broadening ERI's executive moving assistance and computerized home search services to a nationwide basis.

■ George Neil has joined Intranet Industries, Inc., Los Angeles, as manager of product assurance. He will be responsible for establishing internal management control procedures to assure that all computer software and accompanying documentation developed by Intranet meet the company's standards for quality.

■ Computer Machinery Corp. of Los Angeles has named Jack Kraus eastern regional manager. Kraus will be headquartered in New York.

■ Robert F. Hayes, computer operations department, Trust Co. of Atlanta, Ga., has been elected operations officer.

■ Validex Corp., Rochester, N.Y., has named L. Norman Deming executive vice-president. He will direct the marketing effort of the firm.

■ Roger W. Cox has been appointed manager of sales development for commercial computers within Burroughs Corp.'s U.S. business machines group.

■ Sanders Associates, Inc., Nashua, N.H., has announced the appointment of John R. Gillespie Jr. as general manager of its memory products department. He will be responsible for realigning the memory product line to meet the changing military and commercial markets. He will direct all phases of engineering, manufacturing, and marketing of the Sanders line.

■ Control Data Corp., Minneapolis, has announced the appointment of Wallace W. Lindemann as general manager of its new microcircuits division. Lindemann will direct the research, development, and manufacture of hybrid and monolithic integrated circuits and discrete semiconductor devices.

■ Andrew J. Powderly has been appointed vice-president of Computer Assistance, Inc. of

West Hartford, Conn. In his new post, Powderly will have complete responsibility for the services rendered to all computer users in the Fairfield, Litchfield, New Haven, Middlesex, New London, and Windham, Conn., counties.

■ Wilbur W. Castor has been named regional sales director of the newly formed west central region by Honeywell's electronic data processing division. With offices in Minneapolis, he will supervise marketing of Series 200 computer systems through branch offices in Minneapolis, Denver, Omaha, and Kansas City.

■ McDonnell Automation Co. has promoted Richard B. Miskell to regional manager of its Houston office.

■ Edwin H. Bowers will direct computer-based consulting services offered to bank trust departments by Scientific Resources Corp., Philadelphia.

■ Computer Methods Corp., Los Angeles, a subsidiary of Coburn of America Corp. has named Peter J. Foy as technical director for its western division. Foy will be responsible for the implementation and maintenance support of all proprietary software packages and the management of division technical projects in custom information systems, software systems, and programming services. In addition, he will participate in systems design studies and client consultation on systems and software development.

■ John P. Garrity has been promoted from manager of marketing support to national sales manager of data products at Honeywell's communications and data products division. His responsibilities will include the sale and marketing of Honeywell's Keytape data-preparation devices and computer supplies.

■ Norbert E. Frawley has been named to the new post of vice-president, marketing, for Information International of Los Angeles. He will be responsible for all sales, market planning, sales promotion, and advertising in the company.

■ University Computing Co.'s data link division has appointed Irwin H. Findling as director of its new computer center servicing the New York metropolitan area.

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PROGRAMMER-SYSTEMS ANALYST

Manager for new department. Charged with responsibility of implementing management system for modern 265 bed general community hospital. Candidates must have business administration degree or equivalent and one to two years experience as systems analyst or programmer. Contact Mr. W.J. Vanderslice, Personnel Director, Sewickley Valley Hospital, Sewickley, Pennsylvania.

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SYSTEMS

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Corporate growth in our multi-programming environment makes it necessary for us to add people to our headquarters staff located in a small city in Central New York State. We need:

SCIENTIFIC SYSTEMS PROGRAMMERS

High calibre systems programmers with a B.S. in one of the natural sciences, courses in statistics, and 1 to 3 years of scientific work using PL-1, COBOL, or FORTRAN.

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Candidates should have a B.B.A. in business administration or equivalent with 1 to 3 years of commercial systems programming experience in PL-1, COBOL, or FORTRAN.

If you fit either description, send your resume to Robert W. Bunnell, Jr. Employment Representative.

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VP Named for Honeywell Computer Group

WALTHAM, Mass. — J.C. Chu has been promoted to vice-president of planning and development of Honeywell's five-division computer and communications group, which headquarters here in the technology center.

Chu will be responsible for long-range product planning through coordinating product planning activities, major product development programs and allocation of development resources among the group's divisions, and for setting technical and design standards.

Chu has been vice-president of planning and development of the Honeywell's electronic data processing division since 1963 and an assistant general manager of the division since Dec. 1968.

Divisions in the group include the electronic data processing division in Wellesley, the computer control division in Framingham, the international com-

puter and communications division in Wellesley, the information services division, and com-

puter worked with Univac in various management positions, including manager of product planning, chief engineer, manager of commercial engineering, and finally director of engineering. He joined Honeywell EDP division in mid-1962 as director of product planning and was promoted to vice-president of planning and engineering in 1963.

EDPeople

munications and data products division, both in Minneapolis.

For six years, starting in 1956,

Computer Image Elects President

DENVER — Computer Image Corp., in the field of computer animation for motion picture films and video tapes, has elected Bruce L. Birchard president and chief executive officer.

Prior to his election, Birchard was executive vice-president of the company. Before joining

Computer Image he was, for six years, a vice-president of Sony Corp. of America.

The Computer Image animation system can generate a variety of images and humanoid figures. It displays them on a CRT off which moving picture films are made.

Director Recap

J. Pendleton Gaines has been named chairman of the board of Nars Computer Systems, Inc., Orlando, Fla. Nars has one of the largest installations of computer and data processing equipment in the Southeast.

The Mathematical Applications Group, Inc. (Magi), a computer service company with corporate headquarters in White Plains, N.Y., has announced the election of Dr. Martin Leimdorfer to the Magi board of directors.

Leimdorfer is president of Industri-Matematik AB, Stockholm, Sweden, a wholly owned Magi subsidiary. Industri-Matematik provides operations research, system engineering, and information management services to Swedish industry and the Swedish Government.

Three new directors of Path Computer Equipment, Inc., Stamford, Conn., manufacturer of computer peripheral equipment, have been announced by Joseph M. Klockenbrink, president.

The new directors are John D. Shepherd, Frederick J. Coyer, and Edward M. Brown. Shepherd is executive vice-president of Shepherd Management Co., Inc. Coyer is a member of the law firm of Hirschberg, Pettingill & Strong. Brown is a director of Applied Fluidics, Inc., in Stamford.

Pinkerton Computer Consultants, Inc. of Warminster, Pa., has elected Alfred Raws Jr. to its board of directors.

Raws is vice-president of finance and administration with Piasecki Aircraft Corp.

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SYSTEMS DESIGNER

\$14,000-\$18,000

Your ideas on job functions, job objectives, your development & goals are sought & acted upon. Urgent need for Sys/Prog. & Sys/Designer with experience in systems or compiler development. Scientific and/or business applications. Existing work in systems software within the frame work of a modified operating system.

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OPERATIONS RESEARCH ANALYST

\$12,000-\$17,000

Blue Chip company with a dynamic systems & programming department, needs a person with a background in applied math techniques. Knowledge of CRT's to work in an interactive systems group involved with management game playing, linear programming, math models & financial decision making. MUST have FORTRAN & or PL/I.

BAL PROGRAMMER

\$10,000-\$12,000

If you have 2 yrs. BAL S/360 under DOS exp., here is your chance to go BIG in the smallest state in the union. One of the most sophisticated companies in the area will train you to be a Software Specialist. Degree not necessary.

CREATIVE DIAGNOSTIC PROGRAMMERS

\$10,000-\$15,000

Creative is the key word. If you are tired of doing routine diagnostic & would like a chance to do some creative work, call or write immediately! This is a local company with an extremely urgent need.

COMPUTER ANALYST

\$12,000-\$16,000

Blue Chip Co. wants to hire you now if your background of systems programming is related to scientific and/or real-time applications in a multi computer installation. Offering realistic starting salaries, planned salary reviews, and benefits including profit sharing — of which there is plenty to share.

ADVISOR SOFTWARE/HARDWARE

\$10,500-\$12,000

Corp. hqtrs. or consumer service organization needs an EDP professional to join corporate staff. Perform studies, evaluations, make recommendations to executive mgmt., prepare third generation computer configurations & software modifications necessary to create new M.I.S.

PROGRAMMER

\$10,000-\$12,000

Local Rte. 128 firm is looking for 1 yr. minimum exp. in S/360 COBOL or BAL. Individual MUST show ambition & be able to work well with others. Degree not required. Call now for an early appointment.

JR. SOFTWARE SPECIALIST

\$11,000-\$13,000

This position is for a BAL programmer who wants more. Our client company will train a BAL programmer with 1-2 yrs. exp. to become a Software Specialist & learn 360/50 OS. This position also affords the opportunity to take charge of a new software systems group. No degree necessary.

PROG/ANALYST

\$10,000-\$14,000

Dynamic growth opportunity. Take your project from initiation to implementation. If you have a commercial application background and an interest in software development, this is a company that will recognize your abilities & allow you to grow.

CONSULTANT PROGRAMMER ANALYST

\$12,000-\$15,000

A new dimension in consulting firms! Round out your background and move up to corporate level management position in short time. One year third generation programming background will qualify you for this outstanding opportunity. Arrange for your appointment this week.

D.P. MANAGER

\$14,500-\$16,000

Degree strongly preferred. Greater Boston division of a Blue Chip Company is looking for a Pro. Hardware is currently 360/20 card system, however 360/25 disk on order. Person hired will be in charge of conversion & expansion staffing. Applicants MUST be currently at Project Leader level with heavy supervisory exp. Systems background with any applications a MUST as is COBOL. Once in a lifetime opening.

SYSTEMS ANALYST

\$12,000-\$15,000

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MAI Offers Low-Cost Tape Rental Plans

NEW YORK — MAI Equipment Corp. has developed low-cost, long-term rental plans for its IBM plug-to-plug compatible tape and disk drives.

After a study of the plug-compatible market, MAI expanded its marketing plans to include a full range of rental plans — one, two, three, four and five years.

And except for one-year agreements, prices for most rental plans represent a reduction in rates, as much as 12% in some cases, compared to MAI's previous one-year plan which was its only rental plan.

These long-term rental plans follow MAI's marketing strategy for its unit record equipment, which was announced in September.

Also, MAI instituted a purchase option in all rental plans, lowered sales prices and liberalized quantity discounts for its tape drives, and offered quantity discounts for the first time on its disk drives.

MAI says it has installed well

over 2,000 tape and disk drives. MAI put into effect the following price schedule for its tape and disk drives:

- Outright sales prices were reduced as much as 8% on tape drives which were already 34% to 58% below IBM prices. Lowered prices apply to MAI Series 7200 models and Models 2402 and 2403. Prices on MAI Models 2405 and 2406 remain the same.

- Purchase price of the MAI disk drive 2301-I, which was already 23% below IBM's price, was lowered 4%. Price on 2301-II, which was already 33%

below IBM's price, remains the same.

- Quantity discounts on disk drives offered for the first time: 5 to 10, 2%; 11 to 25, 4%; 26 to 50, 6%; 51 to 75, 8%; 76 to 100, 10%. For quantities above 100, schedule of discounts is identical to that for tape drives.

- The offer of purchase options for all customers (whether or not they have purchase options in their lease agreements) is retroactive to the first day of charge. Rental credits to be applied toward purchase for both tape drives and disk drives are: a. 50% of first-year rentals; b. 25% of second-year rentals.

2 Firms Enter Into Field Service Agreements With Honeywell, Inc.

WELLESLEY, Mass. — Computer Consoles, Inc., Rochester, N.Y., and Computer Transceiver Systems Inc., Upper Saddle River, N.J., have entered into

field service agreements with Honeywell, Inc.

CTSI President Allen G. Jacobson said that Honeywell will provide a complete range of maintenance and repair facilities for CTSI's product line.

"Our contract with Honeywell provides for nationwide servicing of all CTSI products," Jacobson reported.

Edward H. Nutter, Computer Consoles president, explained that the Honeywell centers would complement CCI's existing service network, which presently is concentrated in certain key market areas in the eastern U.S.

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trade news

Datagraphix Reconstructs Purchase and Lease Plans

SAN DIEGO, Calif. — Stromberg Datagraphix, Inc., has completely restructured its purchase and lease plans, including guaranteed reduced fixed prices under certain plans, for all major micromation products.

The new plans are designed to provide Datagraphix customers with a wide selection of alternative methods for leasing or purchasing equipment. Although the restructuring generally provides for an increase in prices for one-year leases, substantial decreases are being offered to customers taking advantage of long-term lease agreements.

More specifically, Datagraphix will now offer four different methods for leasing or purchasing equipment: step lease; 60-month lease; conditional sales; and purchase.

The step lease provides declining monthly lease price steps for each year the equipment is utilized plus an attractive purchase option. In most cases, customers taking advantage of this plan will average, over a five-year period, monthly payments that are

lower than those currently in effect.

The 60-month lease provides lower monthly lease charges, an attractive purchase option clause, favorable conditions to "up-grade" the micromation equipment, and complete protection for equipment and maintenance charges during the lease term. Prices under this plan will be up to 10% lower than current prices during a 60-month period.

The conditional sales plan provides a substantial credit for lease payments already made which can be applied toward the down payment for purchase of the equipment and for financing. For present or new customers, conditional sales contracts will be written up to five years after a 15% down payment is made.

The new purchase plan provides lower sales prices for many products as well as a substantial service credit to be deducted from the purchase price.

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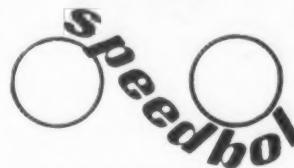
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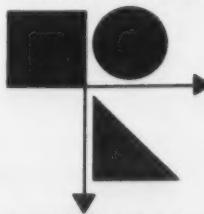
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